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PEARL FRANCES GUEST: IN MEMORIAM

J. R. JOWSEY, 2635 19th Avenue, Regina, Saskatchewan, S4T 1X2.

When friends and family gathered in Regina at Knox-Metropolitan Church on 15 October in a memorial service to celebrate the life of Pearl Frances Guest, there were representatives present from both the Regina Natural History Society and the Saskatchewan Natural History Society. Members of both organizations will remember Pearl's presence at SNHS summer field meets and on the field trips of the Regina Natural History Society.

Pearl Guest was born in the parkland of eastern Saskatchewan at Theodore in 1902 and died in Regina on October 10, 1980. During her life, she faced courageously such adversities as her stay in the Provincial Sanatorium at Fort Qu'Appelle, and she never lost her appreciation and concern for the natural world. After working as a secretary in various branches of the Saskatchewan Department of Agriculture, she retired on 6 October 1967, and used her leisure to travel about Saskatchewan and other provinces of Canada, and to enjoy her wide associations with family and friends.

Those of us who knew Pearl through her participation in natural history outings will remember her interest in the whole range of birds, mammals and plants, and her generosity in sharing her car and camping equipment with others. She did this with an element of obvious enjoyment of the natural world which was unobtrusive but contagious. For various children, including my own, the presence of Pearl Guest on a field trip made the outing an unusually pleasant experience. On these field trips we had the pleasure of meeting other members of her family too. On field trips and in her other work in her church and community Pearl made a point of including people who were less able, through age or infirmity, to become involved.

Pearl Guest was also involved in the "real work" of the Regina Natural History Society. She served some time on the executive and as secretary and was always willing to give a hand when needed. The twenty-five-year history of the society first mentions Pearl in 1947 when she presented a program. A few years later she and her brother, John Guest, made a contribution of twelve oak trees for planting in the Hidden Valley Sanctuary in an area which was designated at that time for imported species. In the June 1959 number of the *Blue Jay* an article by Pearl, "Jeffries Inglewood Bird Sanctuary", is well worth re-reading. She is also mentioned as a participant in the first recorded sighting of a woodcock in the Qu'Appelle Valley (*Blue Jay*, December 1960).

Pearl was also a keen observer of the collage of Canadian life and one of her most recent published items of this sort was an article on the transit of the "silk trains" across Canada in the 1920's (*Western Producer*, August 1979).

Our lives are enriched by the

variety of persons and experiences we encounter. Pearl Guest's presence among us, her friends, her family, and her working associates, has been memorable experience.

Clouds over a northern lake *Wayne Lync*

CONSERVATION OF VEGETATION*

BRENDA FRICK, Department of Biology, University of Regina,
Regina, Saskatchewan, S4S 0A2.

Conservation has been defined in many ways. Two basic dichotomies exist based largely on the questions on "why" and "how". The first lies between what has loosely been termed "resource management", on the one hand and "the ecological approach" on the other. Resource management assumes that certain species, populations or ecosystems are of value to man — hence the term "resource". The emphasis is on conservation for utilization. Man is to be the beneficiary. The ecological approach finds nature valued in and of itself, independent of its value as a human resource, and seeks a position above trade-off for human benefit. Here the emphasis lies on conservation for the benefit of the entity conserved.[16]

The second major dichotomy is centered on whether biotic systems can or ought to be preserved in a static condition, much as a building can be preserved. Where preservation is the goal, systems are managed so that changes within the system (no matter what the causes) are minimized. This is often difficult, as preservation efforts themselves may result in changes. Where change is acknowledged as intrinsic to living systems, the general goal is to ensure that nothing in the existing system is permanently lost as a result of man's activity.[28]

For the purpose of this paper, I will define conservation, ideally, as the maintenance of biota in its naturally dynamic state, for its own intrinsic value. As well as truly natural vegetation, I will include near- and semi-natural vegetation as the objects of conservation. These I will define as self-reproducing aggregations of native plant species. For those interested primarily in animals I will simply stress that for conservation of animals in anything close to a natural state there must first be the conservation of the native vegetation.

Conservation of Species

Conservation of wild plant species is important for a number of reasons. It has been argued, and I believe rightly so, that all species have an innate right to exist, quite apart from their worth to man. Never-the-less, the question is often asked — "What good is conservation to me?" This may be answered practically or at least more egocentricly. Wild plant species have many profound benefits to offer man. The first is the heightened sense of psychological well-being many people find when surrounded by natural vegetation. This is apparent both in the number of people who flock to national, provincial and city parks and in the proliferation of greenery in the urban environment.

Wild plants constitute a reservoir of untapped chemicals which man may find useful in the development of

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*An expanded version of this paper was given as a seminar to the University of Regina Biology Department on 30 April 1980. I would like to thank Dr. G. F. Ledingham and Mrs. Jackie Prescott for helping transform the seminar to written form.

The proposed National Grasslands Park in the Killdeer - Val Marie area of southwestern Saskatchewan would preserve substantial areas of natural vegetation.

Frank Bellamy

pesticides, contraceptives, foods, drugs and industrial products. To consider only one group of chemicals, by 1976, over 1,000 alkaloid forms had been extracted from plants. Some of these are likely to prove active against several forms of tumorous cancer, others are used to treat leukemia, and others are used for cardiac problems and for hypertension. Yet only about 2% of plant species have been examined for such chemicals.[22] Over 10% of plants screened by the National Cancer Institute in the United States showed promise of rendering cancer-relieving drugs.[23]

Wild species which are closely related or ancestral to present crop species are especially important to man as they comprise a genetic reservoir, essential to long-term success in plant breeding. Large and diverse gene pools are becoming increasingly important to plant breeders because of the everchanging demands of the future. Genetic manipulation alone is not sufficient to meet these demands as it would be difficult if not impossible to construct desired phenotypes with no model or description.[11]

Wild plant species are also indirectly beneficial to man in that they provide the habitat and the food for many animal species which man deems desirable.

A final and major selling point for the conservation of plant species rests in the lack of knowledge that we have about basically all wild plant species. We just don’t know if a plant we drive to extinction today might not have proved invaluable to us tomorrow, had we preserved it. Even with the wonders of our technology, extinction remains final.[10]

Conservation of Ecosystems

Not only is it important to conserve wild plant species; it is important to conserve plant communities, vegetations, and entire ecosystems. In essence, conserving ecosystems is the only satisfactory method of conserving species if genetic variation is to be maintained.[1]

The entire biosphere, including man, is dependent on energy fixation by various vegetation types. Man needs not only energy from his crops, but energy tied up currently in forest products, historically in fossil fuels and so on. Cultivation contributes only about 5% of the net global primary production. Other vegetation types, notably the tropical forest at about 29% and marine flora at 32%, make more substantial contributions to the annual fixation of energy.[34]

Natural vegetation is also important in its stabilizing effects. Vegetation acts as a sink for low concentrations of air pollutants. Vegetation is essential in the cycling of nutrients and other elements, and greatly influences local climate.[26]

The loss of natural vegetation, then, results in a loss of a buffering and stabilizing influence. Thus the remaining biota become less capable of recuperating from man's disruptions.[6]

Obstructions to Conservation

The route of conservation is not always easy; a number of factors act as obstructions. Probably the most noticeable is that of increasing human population. More people require more space, exploit more resources and produce more wastes. When human populations were small, people could walk away from their ecological mistakes by emigrating to virgin territory. The population explosion and the apparent finiteness of the world mean this is no longer possible. Increasing population is possible only with increasing technology. Technological destruction of the environment increases even in excess of population growth. The advances in our technology which have given us many benefits, such as increased food production, have also given us the power and the potential for devastating impact on the entire world, including natural systems.[24 32]

Another obstruction to conservation is ignorance. Ignorance both of the need for conservation and of the scale of destruction occurring. Compounding this problem is the frequent separation of the people who benefit from ecosystem destruction and those people who suffer because of it. A prime example of this is the exploitation of natural resources of third world — particularly tropical — countries by the superpowers. Few people in the exploiting country confront the damage and thus realize the true cost of the tropical export.[22]

A far more complex issue, tied in with ignorance, is the question of attitude. Indifference to the need of conservation was summed up in 1966 by a Californian senator with regard to California's giant redwood forests. "A tree is a tree. If you've seen one, you've seen them all."[16]

Economic attitudes create problems for conservation, particularly in the context of resource management. Here the conflict is often between short- and long-term benefits. Ecosystem protection offers very large potential long-term benefits. These benefits extend over a long time and are spread over a great many beneficiaries. This diffusion, however, makes the benefits less perceptible. The short-term benefits of ecosystem destruction are immediate, and concentrated among a limited number of beneficiaries. This renders them more appreciable. Thus conservation is not always advocated even though the total benefits resulting from protection are far greater than the benefits from destruction of an ecosystem.[22]

Integral to this discussion is the philosophy of natural vegetation as common property — common not only among all people today but common to us and to all future generations. Because these things belong to everyone, they belong to no one, and no one is responsible for their wise treatment. In this case, misuse, for individual gain is bound to occur, as each individual pays only his proportion of the damage, whereas the benefit of misuse goes solely to the misuser. Degradation of vegetation then occurs, as more individuals realize their advantage at the expense of the general public.[22]

Humanitarian gain as well as selfish gain can be obstructive to conservation. The short-term benefits of vegetation destruction include such things as production of temporarily arable land in a world where many starve. The technology that pollutes and destroys vegetations may raise its masters from subsistence to financial security. However, methods which rely on depletion and destruction give only transitory benefits, which end when the vegetation or land are depleted and destroyed.

A further complication arises in the way man views nature. In many allegedly primitive peoples, certain aspects of nature were seen as sacred, and this resulted in a very effective conservation of at least those areas or species. Even in our culture, nature is acknowledged as an ultimate form of beauty. However, our culture is largely dominated by the philosophy of man's dominion over the earth. Nature must be subdued so that man's mastery may be displayed. As long as nature is viewed as separate from man, and as existing solely for his use or abuse, conservation will be unlikely. This view of nature is deeply entrenched in the powerful societies of the world today.[28]

Man's Influence on Vegetation

Current estimates of the number of plant species facing extinction range from around 20,000.[22] Myers estimates that the world is currently losing one species per day; will lose 24 species a day by the end of the decade; and will lose 137 species per day by the end of the century.[23] While admittedly, species extinctions occur naturally, in the absence of man, man has greatly accelerated this rate. Even during the great dying of the dinosaurs, the average dinosaur extinction rate was about one species per thousand years.[22, 23]

As a species, man had little impact on the world he lived in until relatively recent times. This changed dramatically with the discovery of fire, agriculture, and domestication of animals, in conjunction with increasing population. Man's impact increased again in the 1600's with the Industrial Revolution.[27]

Today, man induced extinctions of plant species result primarily through destruction of habitat — both directly and indirectly. Favorable habitats are eliminated by fire, and by man's domestic plants and animals. Landscape alterations, such as the use of land for urban sprawl, constructing highways, draining marshes, bulldozing hills, strip mining, etc. greatly alter or consume habitats. The addition of chemicals such as air or water pollutants, pesticides and herbicides effect species directly, and thus alter community structure.[27]

Gladmar Park, Saskatoon, Saskatchewan *J. B. Gollop*

Man's increase in travel has also led to the extinction of plant species, by introducing exotics — both plant and animal — to new and unprepared areas. Introduced species are often freed from the predators, parasites and competitors which kept them in check in their native communities. Thus some are able to increase rapidly. This is to the detriment of native species if the introduction is a predator, parasite, disease organism, competitor or if the introduction alters the micro-environment in an unfavorable way.[27]

Removal of species can also lead to plant species extinction. Obvious examples are the harvest of timber from forest, and the picking of wildflowers by nature enthusiasts and botanists. Also to be included here, however, are the loss of pollinator species and species which control plant pests. The following case of habitat loss is but one example of a widespread phenomenon. In 1831, the study site was a 36 square mile area of deciduous forest in Wisconsin. In 1954, more than 96% of the site had been cleared for agriculture. Less than 1% of the forest was left in a natural state. This was in the form of small, widely scattered patches. Agricultural expansion into prairie vegetation was even more extreme. Often only railroad right of ways remained native.[4]

In 1972, Dasmann considered the proportion of natural areas represented by some form of protection such as national parks and reserves. Biotic provinces are major biotic units, generally accepted by biogeographers. An example might be the Canadian tundra, or the tallgrass prairies. Fully 1/3 of the world's biotic provinces were unprotected by parks or reserves, and a further 1/3 of the areas are only marginally represented by reserves. The new world tropics in particular were very poorly represented.[5]

It is important, however, to note that those areas in parks and reserves, are again, not entirely protected. A very striking example of this is Yosemite National Park, one of the oldest parks in the United States. Despite being in a national park, the Hetch-Hetchy River was dammed. The valley forest was cleared and flooded.[10]

In addition to such outright abuse, national parks in many cases suffer from dual but non-compatible roles. The Canadian National Parks Policy states that the objective of national parks is "protecting for all time, representative natural areas of Canadian significance." Similar policies exist as Provincial Parks Acts. However, national and provincial parks are often supported on the basis of the benefit they offer the public for recreation. The contradiction of these two goals is shown in the case of Ivy Green Provincial Park in British Columbia. According to the B.C. Park Act, this park was dedicated to preservation of the natural environment. The provincial government, in setting up the park installed campsites, toilets, trailer sani-stations, a paved parking lot, and a service yard and thus directly consumed 3/4 of the habitat in this park (which had statutory protection against impairment). This shows clearly the conflict between conservation for utilization and conservation for ecological reasons. The benefit of the user, not of the environment must have held the higher priority.[35]

Visitors to such parks are generally classed as non-consumptive, and it is assumed that their use of the park does not diminish its value. This may not be true. Park visitors are very effective garbage dispersal agents. Personnel of Algonquin Park in Ontario removed 53 tons of garbage from the interior canoe route in 1972 alone.[35] The garbage results in the concentration of wildlife, such as bears, in such areas and thus disturbs the ecosystem. The garbage and the toilet facilities provided result in nutrient enrichment, thus altering the composition of the vegetational community. Visitors to the park introduce exotic species and remove native species which have pretty flowers or would look nice in the garden. Even trampling can cause vegetation effects. It compacts the soil, which retards the growth and hinders germination. Trampling favors low, prostrate, plant species which regenerate rapidly, and hinders tall slow-growing species. This may encourage excessive population growth of weedy species.[29 35]

Examples of Urgency

I would like now to dwell on two specific areas in which conservation of natural vegetation is particularly urgent. The first is the area of agricultural relatives and ancestors. As previously mentioned, these species are particularly valuable to man as they act as genetic reservoirs for plant breeding.

Unlike wild plant species, cultivated monoculture crops are notoriously lacking in genetic variability. This uniformity makes them highly susceptible to biotic attack. The Irish potato blight of 1840 resulted in the death of 2 million people, and the exodus of many more.[20] This example highlights the vulnerability of monoculture crops and points to the need for plant breeding which incorporates the resistance of wild species into crop varieties.

The widely acclaimed Green Revolution was based on plant breeding. New "miracle" strains of grain were introduced, that with irrigation and heavy treatments of fertilizer and pesticides gave tremendous yields. Extensive areas were planted to those strains at the expense of countless local varieties. Although there is much controversy, these strains appear to have greatly increased world food production, particularly in third world countries. Unfortunately for the Green Revolution, money for irrigation, fertilizer and pesticides upon which these miracle grains depend, is hard to come by in these countries. Without them the new grains offer much less advantage.[25]

The extreme danger of programs like the Green Revolution, however, lies in the tremendous loss of diversity which results when countless local varieties are supplanted by the wonder strain. Of course, this increases vulnerability, but the irretrievable loss of local varieties may have more long-lasting effects.[20 25 31]

The wild relatives of crop plants are often found in natural populations in regions where the related crop is grown, especially near places of origin. They are also found as weeds within the crop. If outcrossing is possible this results in a natural exchange of genetic information, and in hybrids. Often the hybrids show advantageous traits in this natural breeding program. Thus, again a great potential is available to man in the form of these weeds.[12] Because they are weeds, however, a concentrated effort is made to eliminate them. The Agriculture Canada research station at Regina was established in part, to eliminate wild mustard. Some strains of the weed have now become important in plant breeding programs aimed at developing atricine resistance in rape.[15]

Another area in which conservation is urgent, is the tropical rain forest. Scientists warn that the rain forests are endangered, non-renewable and within years of non-existence.[2 13 17] Tropical vegetations are extremely vulnerable. The tree species have large, usually poorly dispersing seed. This seed is usually non-dormant. Thus, when the vegetation of an area is destroyed, re-establishment of the primary tree species can only occur by slow invasion from adjacent areas. When large areas are cleared the distance from source to sink can be prohibitive.[13] The rain forest has a very high species diversity: 100 - 200 tree species per hectare[8 26]; 40 - 50% of all plant and animal species.[23] This means that individuals of the same species are often widely separated. Thus, when an area is disturbed, few species are within dispersal range.[13] The nature of tropical soils may also create problems. Where vegetation is cut and burned, rains can quickly wash away much of the shallow soil. The aluminum and iron in the soil make it susceptible to excessive hardening when exposed. This results in hardpan which cannot be revegetated in any reasonable length of time.[8]

Much of the loss of the tropical rain forests is at the hands of foreign exploiters. In the tropical Americas cattle production is a major factor. Virgin forest is cleared, burned, and seeded to grass. For a time it can produce cattle, but inevitably the productivity declines rapidly. Then it may be sold to the native farmer who uses it until all fertility is exhausted.[6]

In Central America, in 1976, 2/3 of the natural forest had been cleared for planted pasture and for beef production. In the Amazon Basin, 100,000 km^2 are cleared per year for cattle production. Costa Rica serves as an example of exploitation. An increase in beef production of 92% was associated with a decrease in local beef consumption of 26%. Most of the extra output was exported to the United States.[22]

Logging is another major factor in S.E. Asia. Three million hectares of forest are cleared for lumber annually.[22] In the Amazon, an American entrepreneur has cleared native forest and planted 250,000 acres with three tree species, grown as monoculture crops.[18] Developing countries encourage such exploitation as it assists trade earnings and brings immediate economic development.

Tragedies of the tropics such as the intentional defoliation of extensive areas of southeast Asia further decrease the likelihood that it can be saved. Yet the very nature of tropical rain forests which render them so vulnerable also render them so valuable. We do not even know the scientific and ecological significance of the tropical rain forests as reservoirs of genetic material. However, as major areas of forest their contribution to biosphere stability must be great and in a finite world where man is an increasingly efficient destabilizer of environment, this may become increasingly important.[6]

Conservation: How?

Even if conservation is given a high priority, sufficient to overcome all mentioned obstacles, a major concern would remain. How can vegetation be conserved? This depends, of course, both on the objectives of conservation and on the vegetation itself. A vegetation which has been truly unaffected by man can obviously best be conserved, as natural, by a continuation of non-disturbance. This vegetational situation, however, must be extremely rare. According to Duffy and Watt, "at present there is no part of the earth's surface, land or water, entirely free from the effects of man's activities. Because of man's pervasive influence, no area can be completely isolated from his direct and indirect influence."[9]

Where alleged natural areas have been maintained by a long history of man's disturbance, conservation efforts must not ignore this effect. In the absence of all human interference, the desirable vegetation may sometimes disappear.[3 7 33]

One of man's most long-term disturbances to vegetation is through the use of fire. Admittedly fires occur naturally, but man has increased their frequency and directed their progress. Much of the world's great grasslands may have resulted from the fire-drive hunting methods of man during the Pleistocene.[27] African tropical savanna and Mediterranean chaparral are probably fire climaxes and thus were created and maintained by man's activity.[7] The grasslands of the arid and semiarid southern United States had been maintained by the burning practices of aboriginal people.[14]

Whether man has been the prime agent or not, many vegetational communities have developed in the presence of occasional or even frequent fire. Inclusion of such areas in various protected states, has in many cases resulted in their protection from the fire that they are adapted to.

In Cypress Hills Provincial Park, fire protection may have severely limited the reproduction of lodgepole pine

A prairie fire *J. B. Gollop*

but not of white spruce. This would result in a change in the character of the park.

In Alberta, fire management plans are being determined for provincial parks. These plans involve the determination of frequency, size and severity of natural and historic fire. The effect of fire on the vegetation, soil, air, water and wildlife are evaluated, as well as the behavior of fire under different conditions. From this data base a fire use policy is established which determines if naturally occurring fires should be allowed to proceed, and if prescribed burning is necessary. Miller found that in some Alberta parks, fire did less damage to vegetation than fire prevention techniques such as fire lines and fire roads.[21]

Another major effect of man on vegetation which is of historic duration is that of grazing domestic animals. Grazing, particularly in conjunction with fire, has been used (intentionally or otherwise) to decimate forests. Sheep and goats are particularly effective in reducing the regenerative abilities of trees and shrubs. Most grazers graze preferentially on more palatable species. This, of course, alters the competitive ability of forage species in a grazed community. Continued assault on desired species results in a decrease of their vegetative vigor and frequency of flowering. This in turn, results in their scarcity or even elimination from the community. By elimination of successively less palatable species, overgrazing greatly alters community structure.

Again, as with fire, sudden cessation of grazing may alter community structure. The effect of grazing is dependent on the relationship of herbivore and vegetation, and in the nature of the vegetation to be grazed.[30] Where many species graze an area, vast number of herbivores can be maintained without prohibitive grazing pressure. Because the various herbivores have different preferences, no forage species is sought to extinction.[19]

A final form of conservation which I want to just briefly mention is that of reducing the impact of man's disturbance. This area is becoming more important as we try to come to grips with the conflict between development and conservation. Environmental study at the planning stages of disruptive projects is a major step forward in correcting attitudes which limit conservation efforts. Reclamation efforts are also important. It is, of course, best to find ways to avoid damaging the environment. This may not always be possible, but ways should be sought to minimize damage if it must occur.

Summary

Conservation of vegetation is important for the well-being of the biosphere, and for the continuance and quality of human life. Conservation needs are truly urgent. Ideal conservation methods must consider the recent impact of man on the vegetation to be conserved.

Woodwell stated that "human-induced biotic impoverishment, in magnitude and potential effects on the biosphere is equivalent to the other great biotic revolutions of geological time — the evolution of aerobic respiration, the appearance of the angiosperms and the splitting and fusion of molecules."[36] Myers sets a similar tone: "The outburst of extinctions now underway . . . represents the greatest debacle since life emerged on earth some 3.6 billion years ago."[23] These may seem overstated, but they describe an important problem: one which we must come to grips with, soon.

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[2]BRETSKY, P. W., S. S. BRETSKY, and J. LEVINTON. 1973. Fragile ecosystems. Science 179:1147.

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PRICKLY-PEAR CACTUS ON THE CANADIAN PRAIRIES

M. G. MAW and M. M. MOLLOY, Agriculture Canada Research Station,
Regina, Saskatchewan, S4P 3A2.

There are three species of cacti on the Canadian prairies: the prickly-pears, *Opuntia polyacantha* Haw. and *Opuntia fragilis* (Nutt.) Haw. and the pincushion or ball cactus, *Mamillaria vivipara* (Nutt.) Haw. This paper considers only the two prickly-pear species because they are often considered to be unwanted or pest species. Cacti are found on dry hillsides and flatlands throughout the more arid parts of the Brown Soils Zone. Here soils are of poor quality, comprising a shallow layer over shale. These areas have some grazing capacity but have limitations that make improvement and cultivation impractical. For example, when the surface is disturbed, the soils are apt to erode and be blown about easily.

Some people are of the opinion that overgrazing increases cactus growth. However, this may be an illusion. Bement's study of heavy, moderate and light pasture use found that while populations of cactus doubled in area in 28 years, it never exceeded 2.4% of the land area.[1] Removal of cactus did not significantly increase forage production but did make it more available to the cattle. In lightly grazed pastures, grass tended to mask the cactus while under heavy grazing the cactus was more conspicuous. Farmers near Avonlea, Saskatchewan, maintain that cactus has not extended its total range of growth much in the past 20 years.

Periodically, especially during droughts, prickly-pear cactus becomes a concern on the prairies. Ranchers then worry that the plant may displace valuable grass, use scarce moisture and cause injury to stock. During these periods various control methods are examined. Because spectacular control of cactus has been achieved in Australia through the introduction of the moth, *Cactoblastis cactorum* (Berg), biological control is often considered in other countries, including Canada.

In biological control programmes, preliminary studies are made to assess the problem and to determine what predators are already present and how effective they are in controlling pest populations. The following is a summary of insect surveys made from 1974 to 1979 on cactus in Saskatchewan and Alberta and of a study of two moths from Argentina as possible agents for cactus control.

Survey of Insects Associated with Prickly-Pears

The following insects were collected by aspirator or picked by hand from prickly-pear. Roots and fruit were not examined.

ORTHOPTERA:
Acrididae
Dissosteira venusta Stal — adult, Buffalo Pound, Sask., 29 May 1974.
Peranabrus scabriollis (Thom.) — adult, Val Marie, Sask., 16 May 1975.

HOMOPTERA:
Coccidae

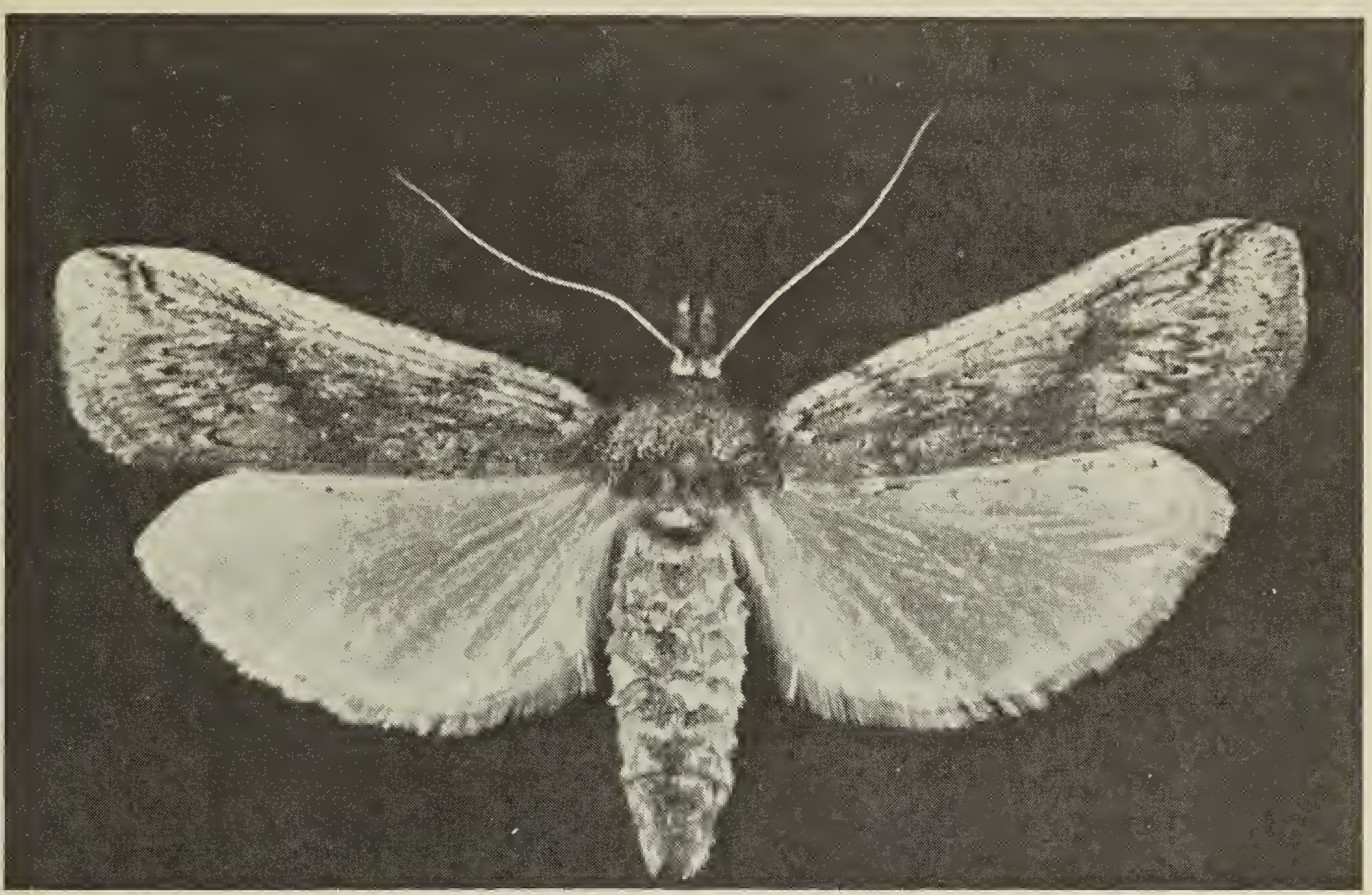

Fig. 1. Melitara dentata *(Grote), a common cactus insect* *M. M. Molloy*

Dactylopius confusus (CK11.) — all stages, Buffalo Pound, Sask. — 29 May 1974. Avonlea, Sask. — 1 June 1974; 23 June 1977. Aylesbury, Sask. — June 1974; Manyberries, Alta. — June, 1974. A widespread cactus mealybug. Most northerly recorded point, Aylesbury, Sask. Can be very destructive.

HEMIPTERA:

Coreidae

Chelinidea vittiger Uhler — immatures, Irving, Alta. — 26 June, 1979. A gregareous feeder on the pads.

Chlorochroa uhleri Stal — adult, Val Marie, Sask. — 10 May 1973. A general plant feeder.

COLEOPTERA:

Carabidae

Microlestes linearis LeC. — adult, Val Marie, Sask. — 17 May 1975.

Melyridae

Collops vittatus Say — adult, Buffalo Pound, Sask. — 7 July 1977.

Listrus provincialis Blais — adult, Irvine, Alta. — 26 June 1979.

Meloidae

Epicauta atrata (Fab.) — adult, Readlyn, Sask. — 2 July 1973.

Epicauta ferruginea Say — adult, Readlyn, Sask. — 2 July 1973, Buffalo Pound — 7 July 1977.

Anthicidae

Anthicus hastatus Casey — adult, Val Marie Sask. — 17 May 1975.

Nitidulidae

Carpophilus pallipennis Say — adult, Readlyn, Sask. — 2 June 1973, Avonlea, Sask. — 23 June 1977, Irvine, Alta. — 29 June 1977. In the flowers, very numerous.

Tenebrionidae

Hyperaspis sp. — adult — Manyberries, Alta. — 19 June 1974.

Melanastus sp. — adult, Manyberries, Alta. — 19 June 1974.

Elcodes obsoleta Say — adult, Val Marie, Sask. — 17 May 1975.

Curculionidae
Gerstaekeris basalis LeC. — adult, Val Marie, Sask. — 17 May 1975, Eastend, Sask. — 10 June 1975. Breeds in cactus pads.
Bagous sp. — adult, Val Marie, Sask. — 17 May 1975.

DIPTERA:
Milichiidae
Milichia sp. — adult, Buffalo Pound, Sask. — 7 July 1975. Genus associated with decayed plant material.

LEPIDOPTERA:
Phycitidae
Melitara dentata (Grote) — larvae, Buffalo Pound, Sask. — 29 May 1974, Manyberries, Alta. — 19 June 1974, Avonlea, Sask. — 23 June 1977. Larvae mine the pads. Can be very destructful. About ten percent of pads in Saskatchewan and Alberta attacked.

Hesperiidae
Pyrgus communis Grote — adult, Irvine, Alta. — 26 June 1979.

Biological Control Studies

Agriculture Canada's Regina Research Station obtained two species of moth, *Cactoblastis doddi* Heinrich and *Cactoblastis bucyrus* Dyar, for biological control studies. Their origins were the high altitude valleys of Jujury province in northern Argentina. In the laboratory both species fed on Canadian prickly-pear but it was necessary to injure the pads before the larvae would enter and feed. Once inside, the larvae hollowed the pads but would not leave to go to fresh ones when there was no more food. Failure to leave the depleted pads is contrary to their habits in Argentina where they move from pad to pad as conditions dictate. Either the Canadian cactus was unsuitable or the insects were diseased for both species became weak and died out after a few generations in the laboratory.

Discussion and Conclusions

No further introductions of cactus insects are planned. *C. doddi* and *C. bucyrus* apparently are not suited to our Canadian cacti. Other species could, however, be tested. It appears that any harm or inconvenience caused by our prairie cactus is balanced by benefits derived from it. The native biotic agents already exert considerable pressure on the cactus and our native grasses are well able to compete satisfactorily when the land is not overgrazed.

The value of cactus in the ecosystem has not always been appreciated. During drought or under heavy grazing, cactus reduces soil erosion. Clumps of cactus conserve moisture by holding snow, and after summer showers, the soil within the clumps remains moist for several hours longer than soil surrounding them. The clumps slow runoff and protect seeds of desirable plants so necessary for repopulating the range after severe drought or heavy grazing.[2]

Prickly-pear provides food for at least 44 species of birds and mammals. The seeds may account for 65% of the diet of the Harris ground squirrel and up to 5.0% of the browse of deer and antelope.[3] During the summer, cactus may constitute 30% of the food of the black-tailed jack rabbit[4] and is the main food of the pocket gopher[5].

The introduction and release of a biotic agent to control prickly-pear in Canada would be vigorously opposed by both the United States and Mexican authorities because they regard cacti as an emergency fodder for cattle, and as human food.

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Prickly-Pear Cactus *G. H. Hardy*

CHESTNUT LAMPREY AT ROUND LAKE, 1980

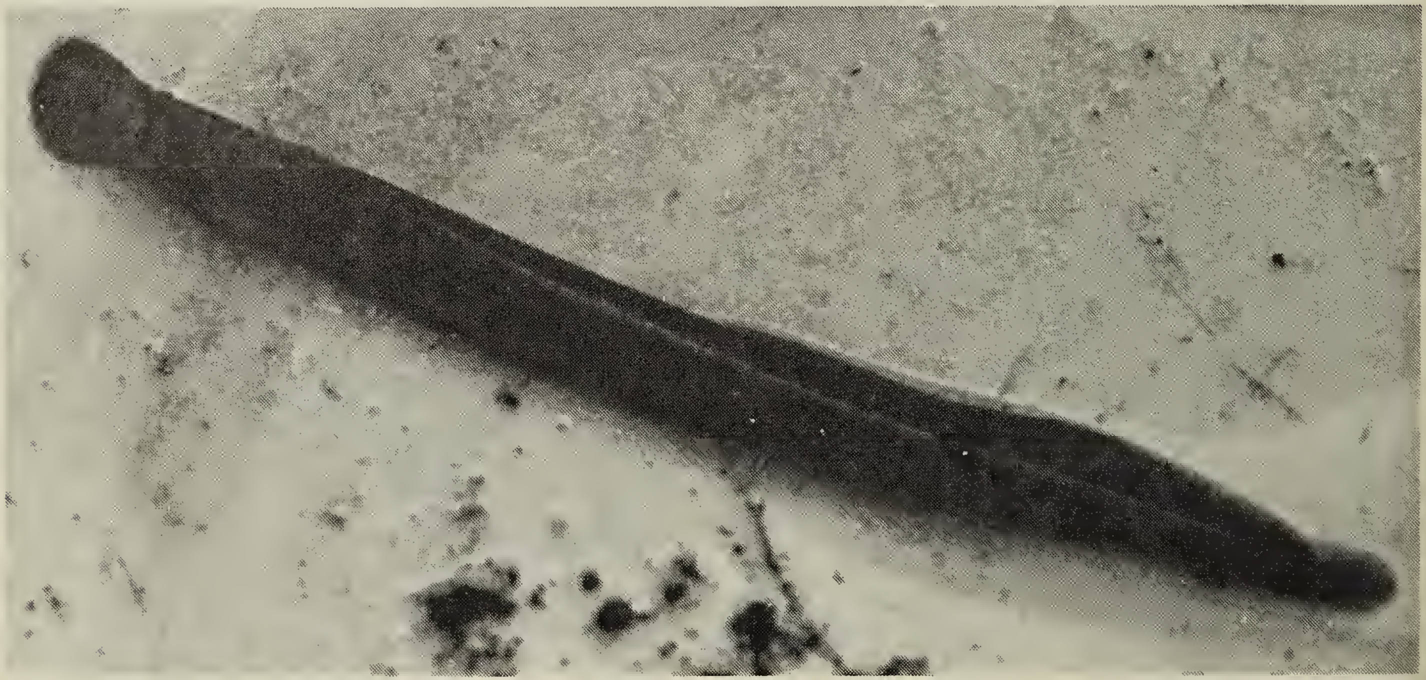
RON JENSEN, 1027 King Crescent, Saskatoon, Saskatchewan, S7K 0N9.

Lampreys have been collected on three occasions in Saskatchewan. The most recent one was taken during the Saskatchewan Natural History annual summer meeting at McKay Camp on Round Lake in the Qu'Appelle Valley.

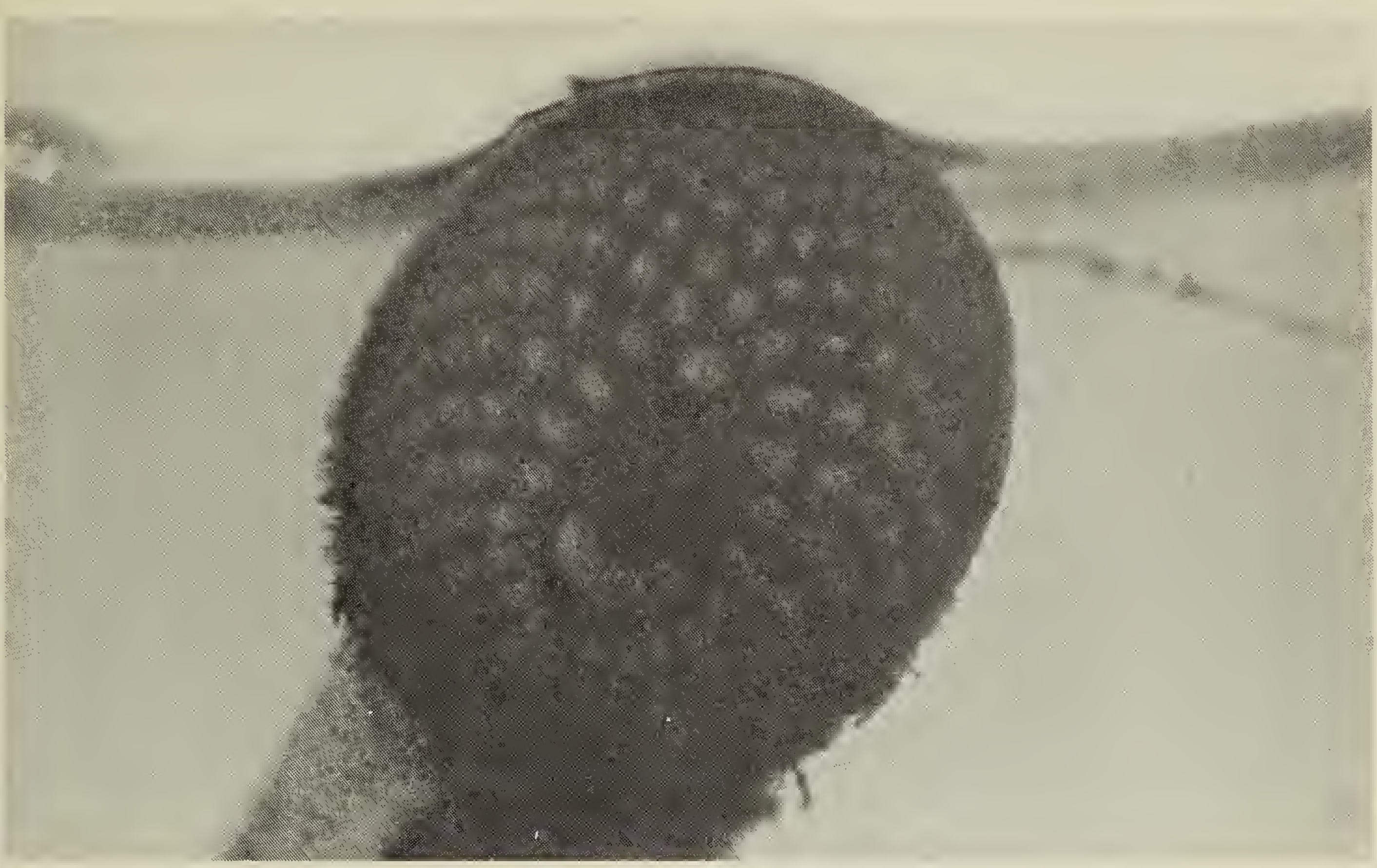
In June 1980, Hugh McLaughlin and Ron Jensen arranged a seining demonstration for those attending the summer meeting. The demonstration took place on the downstream side of the Round Lake control structure in a small pool. A single pull produced eight species of fish: common white sucker, northern pike, burbot, spottail shiner, emerald shiner, johnny darter, Iowa darter, and chestnut lamprey.

Two previous specimens of the chestnut lamprey were collected at the Round Lake control structure in 1965 and at the dam on the Whitesand River near Canora. These were 14.1 and 11.8 cm long, respectively. This third chestnut lamprey measured 15.3 cm in length. The specimens mentioned are in the possession of the Fisheries Research Laboratory in Saskatoon.

The chestnut lamprey (*Ichthyomyzon castaneus*), a member of the *Petromyzontidae* family, is a small parasitic lamprey with a cylindrical body, single dorsal fin, and an oral sucking disc armed with teeth. Predominantly a stream dweller, the young chestnut lamprey or ammocoete (larvae) prefers moderate current, stable bottom of sand or silt, and a little growth of *Chara*. The ammocoete's life span is presumably 5-7 years, metamorphosis to an adult occurs in the fall of the last year. It is as an adult during the fall that this lamprey is parasitic, overwintering in



Chestnut Lamprey *Gary W. Seib*



Oral sucking disc of Chestnut Lamprey *Gary W. Seib*

an inactive state to spawn in June or July of the following year, after which adults die.

Distribution in Canada, according to the map in Scott and Crossman, is in southeastern Manitoba.[1] Ernest Seton Thompson recorded this species from the Assiniboine River in 1898.

I would like to thank Mr. Hugh McLaughlin who was the driving force for the seining demonstration.

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Chestnut Lamprey at Round Lake *Gary W. Seib*

OBSERVATIONS OF THE SHORT-HORNED LIZARD IN SOUTHEASTERN ALBERTA

MAJA LAIRD and ROBIN LEECH, 10727 - 64th Avenue, Edmonton, Alberta,
T6H 1T1.

The spring and early summer of 1980 in southeastern Alberta was unusually warm, dry and windy. As a result, many hibernating animals were out from their hibernacula and active several weeks earlier than normal. By mid-April, the ground was completely free of snow, and in many places, very dry and dusty. Between 27-29 April, the nightly average low was 18°C and the daily average high was about 32°C.

Both of our observation sites for the short-horned lizard (*Phrynosoma douglassi brevirostre*) appear to be new to the literature, but inside the range shown for the species by Lewin and Showalter.[3] [6] The comment by Milner that the lizards are found in the ". . . southeastern portions of the Red Deer River" is incorrect, as they have not (yet) been found there, or elsewhere that far north.[4] Butler did not indicate much about distribution of the short-horned lizard in Alberta other than that it is at ". . . its northern-most distribution in Alberta."[1]

Within its range in Alberta, the short-horned lizard appears, or is

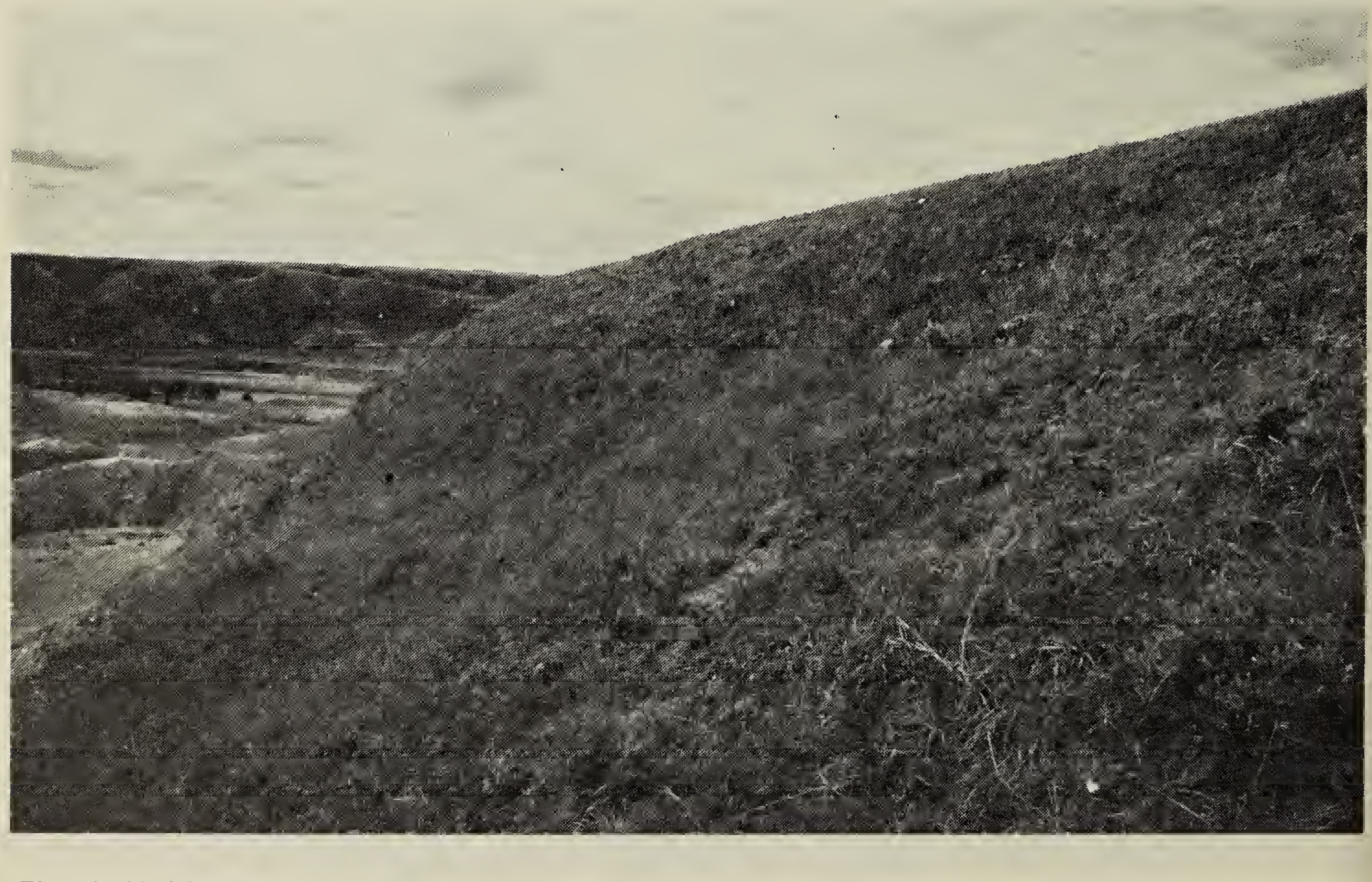

Fig. 1. Habitat of short-horned lizard. Most lizards were found from the top of the bank down to about 4-5 m from the top.

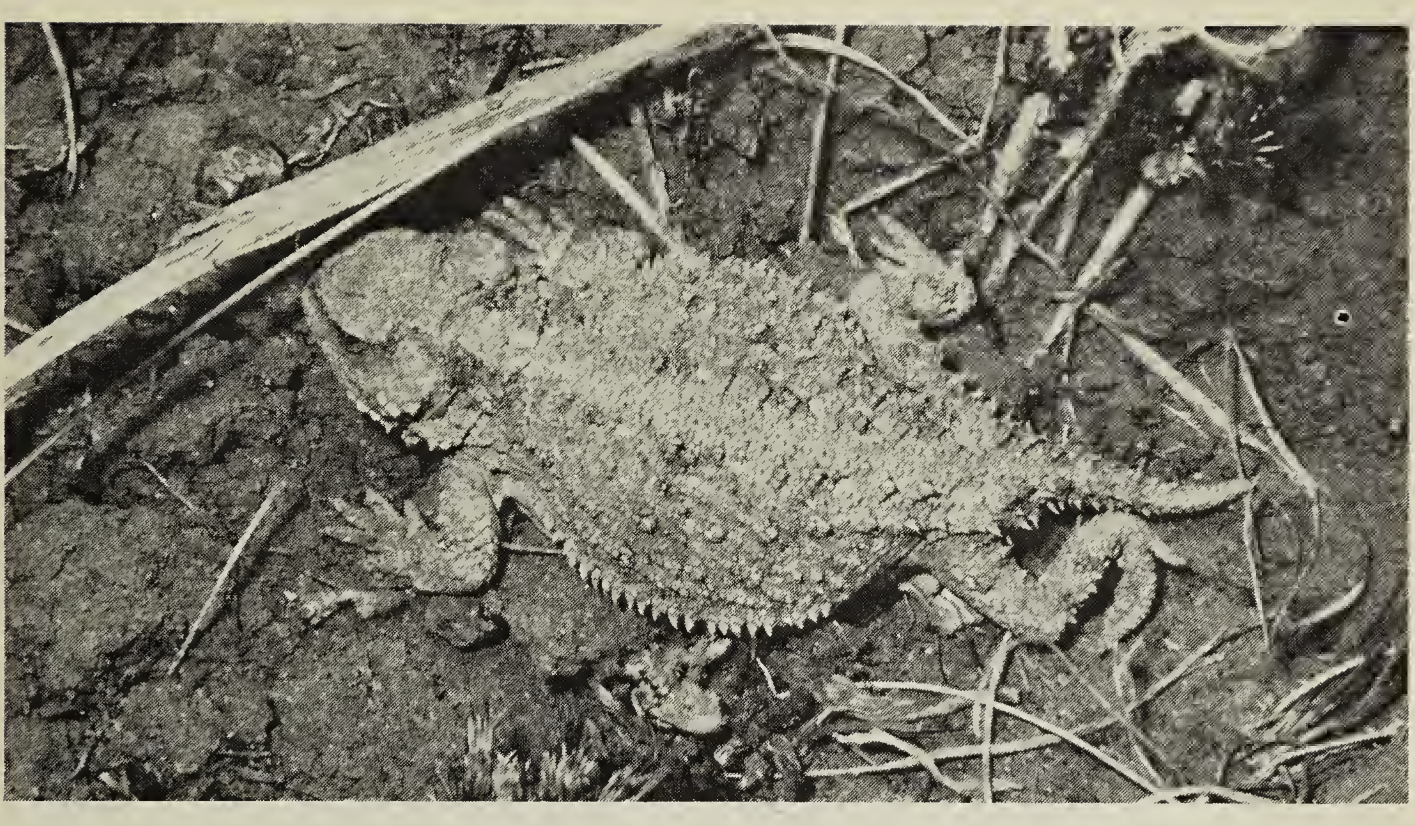

Fig. 2. An adult female short-horned lizard shortly after spring emergence.

found, only in very selected spots.

In the late afternoon and early evening of 27 April, one large, old female short-horned lizard, and one prairie rattlesnake (*Crotalus viridus viridus*) were observed on the uppermost edges of the north banks of the South Saskatchewan River. The site is on the ranch owned by Dick and Janet Rose, and is approximately 20 km south of Suffield. To the best of our knowledge, this was the earliest sighting ever made for a short-horned lizard in Canada (L. Powell, pers. comm.).

The following morning (28 April) at our camp, which was about one-half km from the north banks of the South Saskatchewan River on the Rose's Ranch, we found one more rattlesnake travelling "cross-country." This indicated to us that the rattlesnakes had probably been out for a week or so, had mated, and were now dispersing to the summer feeding areas. (Local residents feel that rattlesnakes which hibernate along the north banks of the South Saskatchewan River move as much as 30 km north to the summer feeding areas, and back again by fall.)

During the morning of 28 April, two more rattlesnakes and two bull snakes (*Pituophis melanoleucus sayi*) were encountered. All the snakes found were plump and appeared to be in excellent condition. Later during the summer on 25 July, one large rattlesnake about 1.4 m long and about 9.0 cm diameter was found 4 km north of Jenner's Ferry. According to a rancher just north of Jenner's Ferry at Big Stone, rattlesnakes are not known to be north of the Red Deer River in that area.

On 1 May, a male short-horned lizard was found approximately 8 km due south of the Onefour research station on the north banks of the Milk River.

On 27 July, we observed a female short-horned lizard from the Rose's Ranch give birth to seven live young. The young were born either head first or tail first in a sac from which they wriggled free in 30 seconds or less. The first four babies were born in 20 minutes (about five minute intervals),

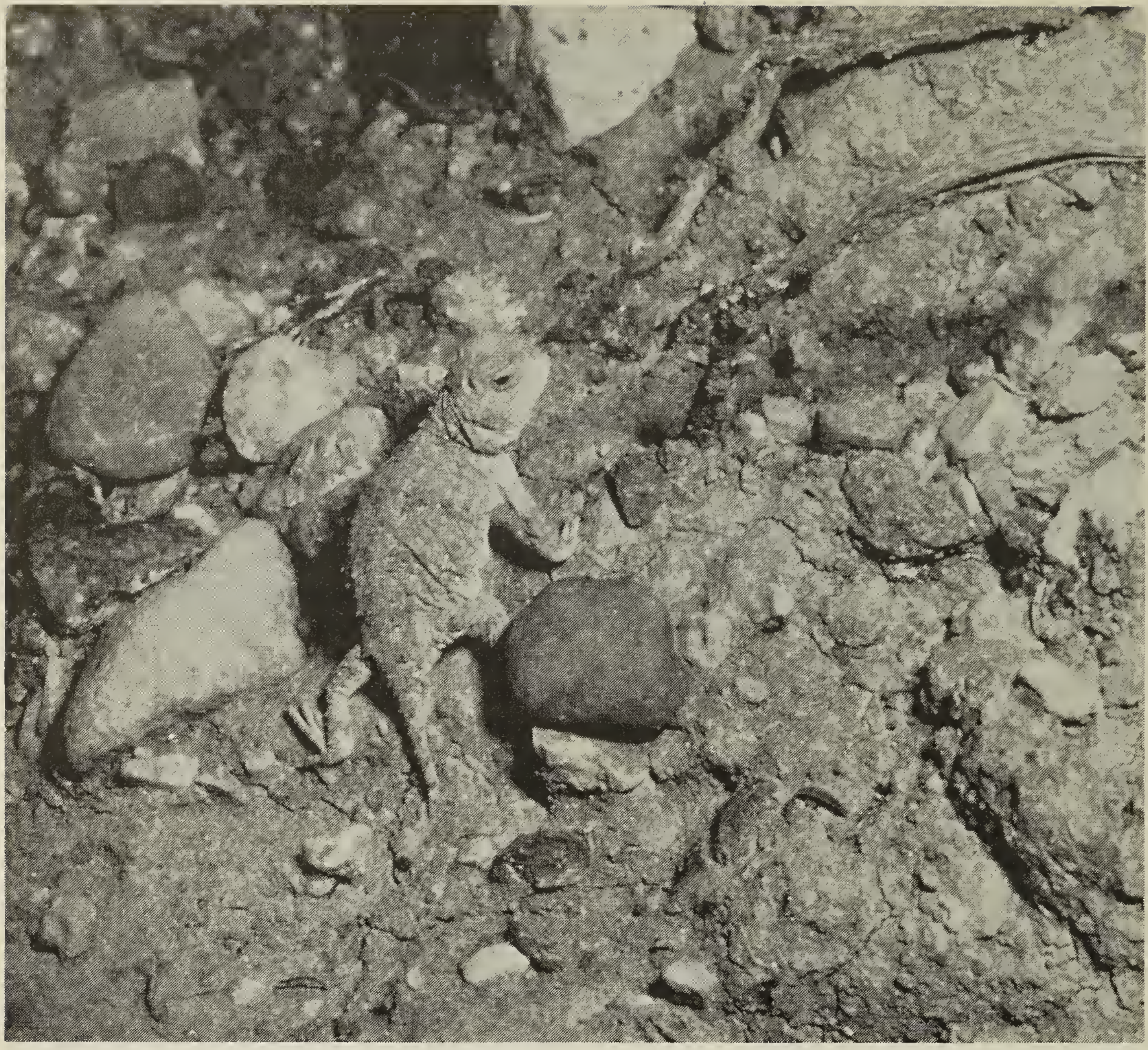

Fig. 3. Young of year short-horned lizard in its feeding habitat.

and the remaining three in 42 minutes (at 12-15 minute intervals). The baby lizards were each about 30 mm long, and were actively eating very small ants about an hour after birth. (The births were recorded on 16 mm motion picture film.)

Both Stebbins and Conant stated that ants form a major or favorite part of the diet of horned lizards.[7] [2] Our observations indicate that almost any insect that can be subdued will be eaten, including adult crickets, immature grasshoppers, carabid beetles, lygaeid bugs, and ants. Powell (*in litt.*, 10 June 1980) found the following when he used a stomach pump on short-horned lizards: mostly ants, beetles (including tiger beetles), assassin bugs; less frequent were grasshoppers, crickets and ". . . odd grubs and other peculiarities." The above-named are the most commonly encountered insects in the habitats frequented by horned lizards.

We observed that an adult female short-horned lizard can eat at least three crickets and a number of ants each day; a male can eat one cricket and from six to 10 ants each day. Female horned lizards are considerably larger than the males.

Once grasped in the mouths of the lizards, large crickets and beetles are

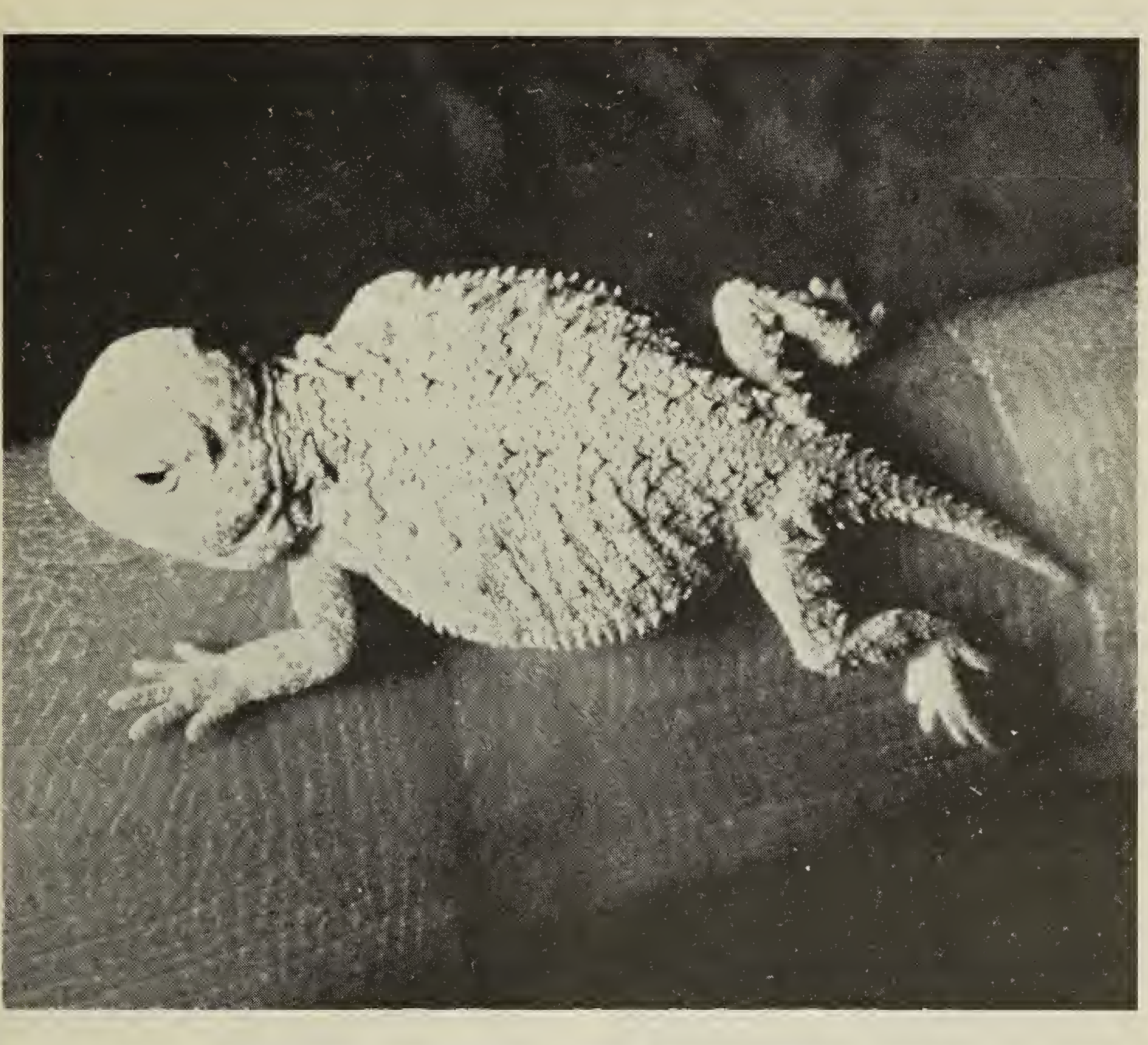

Fig. 4. Young of year short-horned lizard on index finger of second author. The lizard is about 30 mm long.

always smashed against the ground by the lizards, presumably in an effort to kill them before swallowing. Often wings and legs are knocked off the insects during these smashings. (Members of the closely related genus *Sceloporus* have also been observed, by the second author, smashing larger insect prey in the same manner.) Larger insects are always eaten head first.

Short-horned lizards have several very different reactions when confronted by many ants at one time. Often ants will crawl all over the lizards, in which case the lizards close their eyes and "freeze." However, if the ants start biting, the lizards panic — legs flail in an effort to dislodge the ants, then a very hasty departure is made from that vicinity. On one occasion, we observed a male lizard being attacked. His reaction was to bury himself partially, especially that part of him where the ants were attached and biting (*ie*., legs and toes).

Short-horned lizards seem to prefer to position themselves where ants can be encountered in ones and twos, whereupon they are snapped up singly and quickly.

We observed that when it is warm (22° to 25°C or more), but cloudy, the short-horned lizards do not seem to feed readily, even when prey walk by within easy striking distance. However, when it is hot and sunny, they do feed readily. We are not sure if this behavioral difference is that they cannot see well unless the sun is shining, or whether there is a slight temperature difference (thus greater activity on the part of the lizard) in direct sun. Insects that are in the shade, or that are even slightly camouflaged, are not readily preyed upon. On the other hand, dark or distinctly colored insects are readily preyed upon.

Stebbins stated, ". . . fine loose soil for burial seems to be essential" for horned lizards.[7] This comment is in reference to self-burial by horned lizards at night. Our observations are that short-horned lizards bury themselves each night in soft, sandy soil. The time of evening burial and morning arousal seems to be temperature-related — the warmer the evening, the later the burial, and the warmer the morning the earlier the arousal. Generally, they bury themselves between 1800-2000 and arise between 0700-1000, although we have seen early arousals at about 0630. We suggest that it is also possible that barometric lows will retard the lizard's arousals, and that highs will advance them (possible temperature relationship, too?).

Most often short-horned lizards bury themselves completely with up to a centimetre of sand covering the entire body. If the sand is not too deep, or is a bit crusty or clay-bearing, the tail and some of the central area of the back may remain uncovered.

We have observed many horned lizard "burials," and the manner of burial seems to be related to the size and strength of the lizard, and to the hardness of the soil. Larger lizards can "burrow in" headfirst, using fish-like wiggles and their hind legs (but not the fore legs) to help, whereas smaller lizards frequently use their fore and hind legs to help with the burrowing in. The lizards arch their body slightly as they burrow in so that only the front of the head and the body about the hip region are touching the ground. The burial action usually takes no more than about 10 to 20 seconds. Burial can occur in as little as 5 cm, but more usually in about 15 cm, horizontal distance.

Acknowledgements

Our sincere thanks to Dick and Janet Rose for discussions regarding the lizards, and for allowing us to use their property during the course of these observations. We also thank Larry Powell, graduate student, University of Calgary, for showing us several different short-horned lizard sites, for many long discussions on horned lizards in general, and for reviewing the manuscript critically. The observations and pictures were taken while on contract with Karvonen Films Ltd. We thank Albert Karvonen for permission to use his company's pictures for this article.

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EARLY QUILL LAKE ORNITHOLOGISTS

C. STUART HOUSTON, 863 University Drive, Saskatoon, Saskatchewan,
S7N 0J8.

The first naturalists to explore the Quill Lakes area intensively were John Farwell Ferry and R. Magoon Barnes in 1909. Both were Americans. Ferry came to collect bird skins and eggs in order to prepare habitat cases for the Field Museum of Natural History in Chicago, Illinois. He came first to Prince Albert where he collected from 26 May to 7 June. He was then told of the almost unlimited wealth of bird life at the Quill Lakes, and he collected there from 9 June through 11 August, apart from a two week absence in late July. Ferry's observations, of great historic importance, were published in *The Auk* 27:185-204, April 1910.

The grandson of a wealthy dry goods merchant, Ferry had graduated in civil engineering from Yale University in 1901. After one year working for the Y.M.C.A. and two years in business, Ferry decided to indulge his love for nature and became a collector for the United States Biological Survey for two years. Early in 1906 he joined the Field Museum of Natural History in Chicago. Immediately preceding his Quill Lakes trip he had been on a collecting trip to the Caribbean islands along the north shore of Venezuela, where he had collected eight bird species not previously described, one of which was named *Caereba ferryi* in his honour.

During much of his Quill Lakes trip, Ferry had as his companion Richard Magoon Barnes, a lawyer for the Central Illinois Railroad at Lacon, Illinois, and an enthusiastic collector of birds' eggs.

In 1909 the plains around the Quill Lakes were beginning to recover from the ravages of almost yearly prairie fires. Ferry wrote: "Poplar thickets or 'bluffs' as they are locally termed, are a characteristic feature of the landscape. Toward the southern end of the lake they almost entirely disappear, while around the northern edge, they run together to such an extent that the term continuous woodland might be used to describe a large portion of the area they cover." However, most aspen bluffs contained young, short trees, for crow nests "were usually placed six or seven feet from the ground in poplar thickets . . ."

Ferry and Barnes were assisted by Herbert C. Clark, a local farmer whose younger brother had watched a pair of Whooping Cranes along the east shore of Big Quill nearly all spring. R. M. Barnes saw a Whooping Crane at the north shore of the lake on 14 June 1909. By 1913 William T. Hornaday's book, *Our Vanishing Wild Life* assumed that this large, white crane had already gone the way of the recently-vanished Passenger Pigeon. After two seasons without any sightings of the Whooping Crane anywhere in North America, Hornaday credited the 14 June observation at Quill Lake as the last sighting by human eyes.

The Greater Prairie Chicken or Pinnated Grouse had recently moved in from Minnesota and Manitoba to occupy the lush grass no longer grazed by bison. In 1909, Ferry reported that the Pinnated Grouse was as common as the Sharp-tailed Grouse, also but incorrectly called "prairie chicken", then as now. (The Pinnated Grouse disappeared in the 1930's).

The Upland Sandpiper, so common on the open prairie when the first settlers arrived, was already becoming uncommon by 1909, but the Long-billed Curlew, a larger grassland representative of the wading birds, was still "abundant."

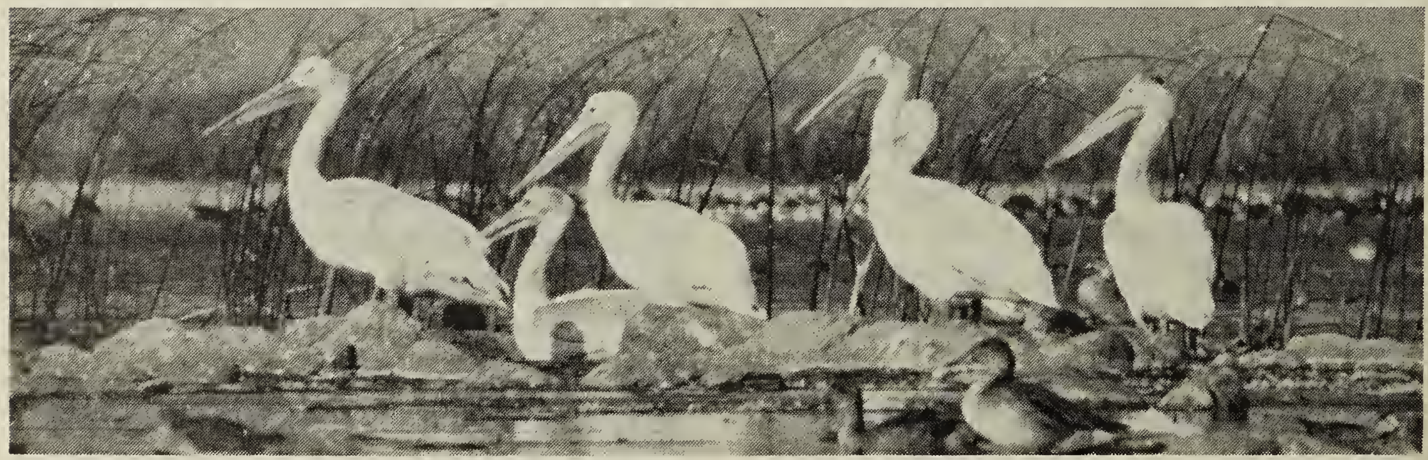
Mourning Doves had arrived from the southeast along with the settlers in the preceding years, but were still rare, with only four sightings of single birds recorded. Barn Swallows similarly were not yet common, for farm buildings were relatively new. The only barn swallow nests were "several . . . under a bridge at Quill Lake." A Purple Martin, lacking dead, hollow trees of sufficient size in the wild, had nested in the hollow eave of a settler's cabin at the north end of the lake. The House Sparrow, another new immigrant, was still rare, with only one sighting.

A Brown Thrasher nest found by a settler that year was one of the first ever reported in Saskatchewan. Before farm shelter belts grew up, and before trees were planted along village streets, the American Robin was a rare resident.

Ducks and geese were then common, with geese still evading the settlers' guns and egg-collecting on their island nest sites. Coots or mudhens were then rare in the sloughs near the lakes.

Their greatest thrill was to visit the islands in Big Quill and Middle Quill Lakes, teeming with colonial bird life. There were in 1909 no less than seven Common Tern colonies on seven islands, three Double-crested Cormorant colonies of more than 50 nests each, and a large White Pelican colony with several hundred nests on the extreme south island on Big Quill Lake.

Ferry, who had been born 12 October 1877, had his promising career terminated abruptly at the age of 32 years, when he died of pneumonia on 11 February 1910, less than six months after returning from Saskatchewan. Barnes, fifteen years his senior, having been born 21 April 1862, had just become editor that year of *The Oologist*, a monthly magazine dealing with egg-collecting. Egg-collecting was then a more popular hobby than collecting postage stamps or coins. Barnes continued publishing *The Oologist* until he was 80 years of age, and died on 18 July 1945. He had life-long memories of one of Canada's finest wildlife habitats, but he did not return.



White Pelicans *G. W. Beyersbergen*

THE LONG-BILLED CURLEW IN SASKATCHEWAN: STATUS AND DISTRIBUTION

WAYNE E. RENAUD, LGL Ltd., 44 Eglinton Avenue West, Toronto, Ontario, M4R 1A1.

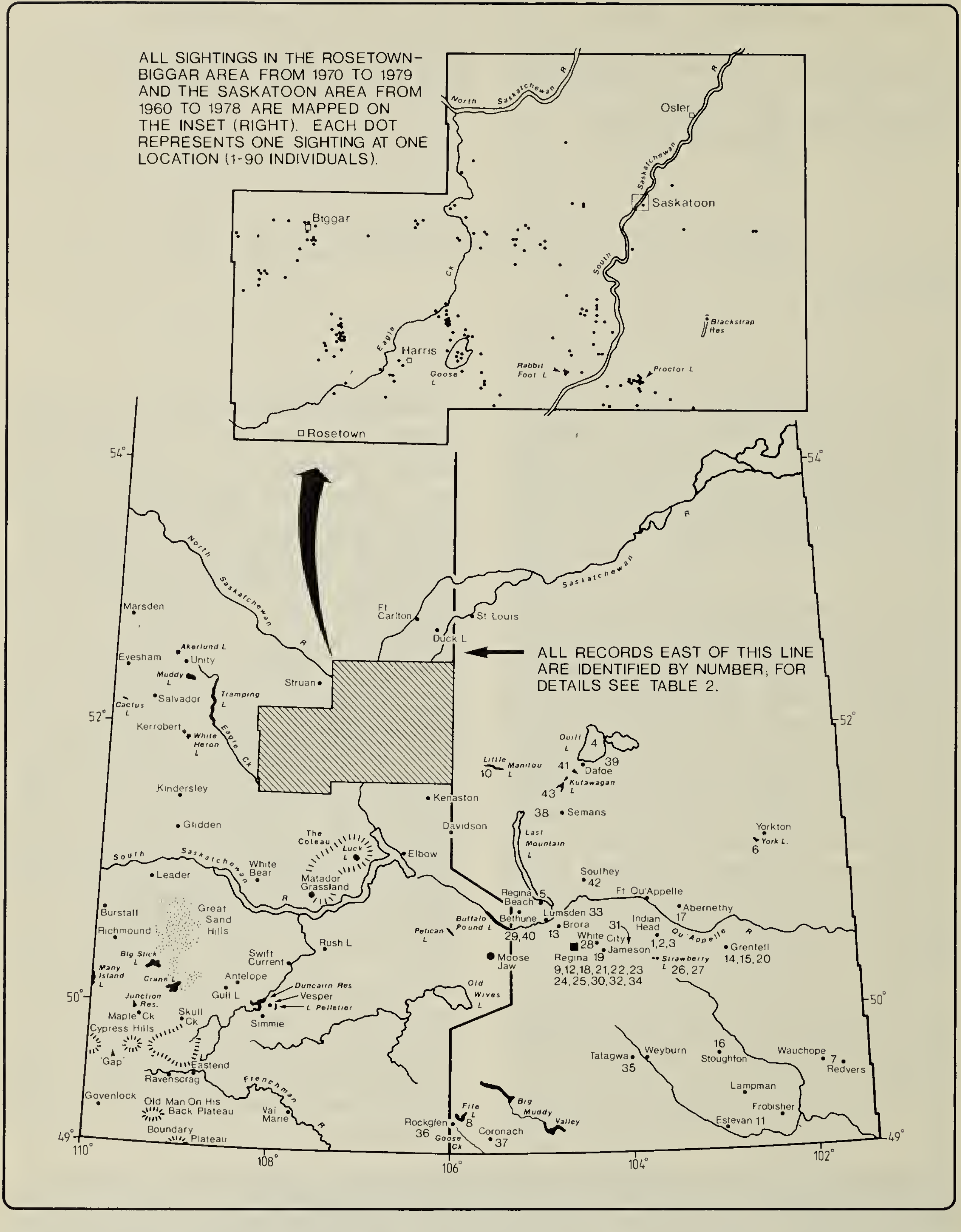
The Long-billed Curlew is one of the largest shorebirds in the world, attaining at maturity a length of up to 65 cm (including a bill up to 20 cm long) and a weight approaching 1 kg (2 pounds). Unlike many less conspicuous birds, it was often recorded by early settlers and explorers, and thus its pre-settlement distribution throughout much of Saskatchewan is almost as well documented as its present day status. Ironically, in spite of its large size, its alert disposition has made the study of natural behaviour difficult, and much remains to be learned about its habits. In fact as late as 1979, when "A Field Guide to Western Birds' Nests" was compiled, not even its incubation period was known with certainty.[9]

Like many North American birds, the Long-billed Curlew has suffered population declines throughout its range in the past 150 years due to such factors as spring hunting and loss of habitat.[7 4 25] Some have suggested that the curlew's rate of decline has been arrested, or even turned around, in recent years,[25 37] however, there is abundant evidence that it remains much less common in Saskatchewan than it was in the late 1800's and early 1900's. While spring hunting no longer poses a threat to the Long-billed Curlew, habitat loss in Saskatchewan has already contributed to its disappearance from large areas of its range.

This paper attempts to summarize various aspects of the Long-billed Curlew's life cycle in Saskatchewan, and documents its distribution and population declines since settlement of the plains began in the 1880's. Information was gathered in 1979 from published and, especially, unpublished sources. For the sake of brevity, contributors of previously unpublished information are acknowledged in the text by their initials in parentheses, followed by an asterisk to indicate a personal communication. For example, "(AY*)" indicates a personal communication from A. G. Young; the notation "(SM-MG*)" indicates an observation by S. A. Mann as received from M. A. Gollop. Observers, correspondents and institutions are listed at the end of the paper. Unpublished manuscripts are listed with published reports in the references. Saskatchewan place names mentioned in the text appear in Figure 1.

Spring Migration

A summary of spring arrival dates from representative localities in Saskatchewan and southeastern Alberta is given in Table 1. First arrival dates from some other Saskatchewan localities with sporadic coverage or few records were: central Qu'Appelle Valley, 27 April;[5] Kenaston, 22 April (LB*); Matador, 14 April;[20] Moose Jaw, 16 April;[18] Regina, 16 April



ALL SIGHTINGS IN THE ROSETOWN-BIGGAR AREA FROM 1970 TO 1979 AND THE SASKATOON AREA FROM 1960 TO 1978 ARE MAPPED ON THE INSET (RIGHT). EACH DOT REPRESENTS ONE SIGHTING AT ONE LOCATION (1-90 INDIVIDUALS).

ALL RECORDS EAST OF THIS LINE ARE IDENTIFIED BY NUMBER; FOR DETAILS SEE TABLE 2.

Figure 1. Saskatchewan place names mentioned in the text, and records of Long-billed Curlews in eastern and some northern areas of the species' range.

(MB*); Swift Current, 19 April (RPe*) and White Bear, 18 April (SJ*).

The earliest certain spring arrival date for the province was on 8 April (1967) at Skull Creek north of the Cypress Hills (SM-MG*); Mann had one earlier record of one identified by call only on 26 March 1947 (MG*—excluded from Table 1). The curlew's arrival in the extreme southwest averages about 17 or 18 April, similar

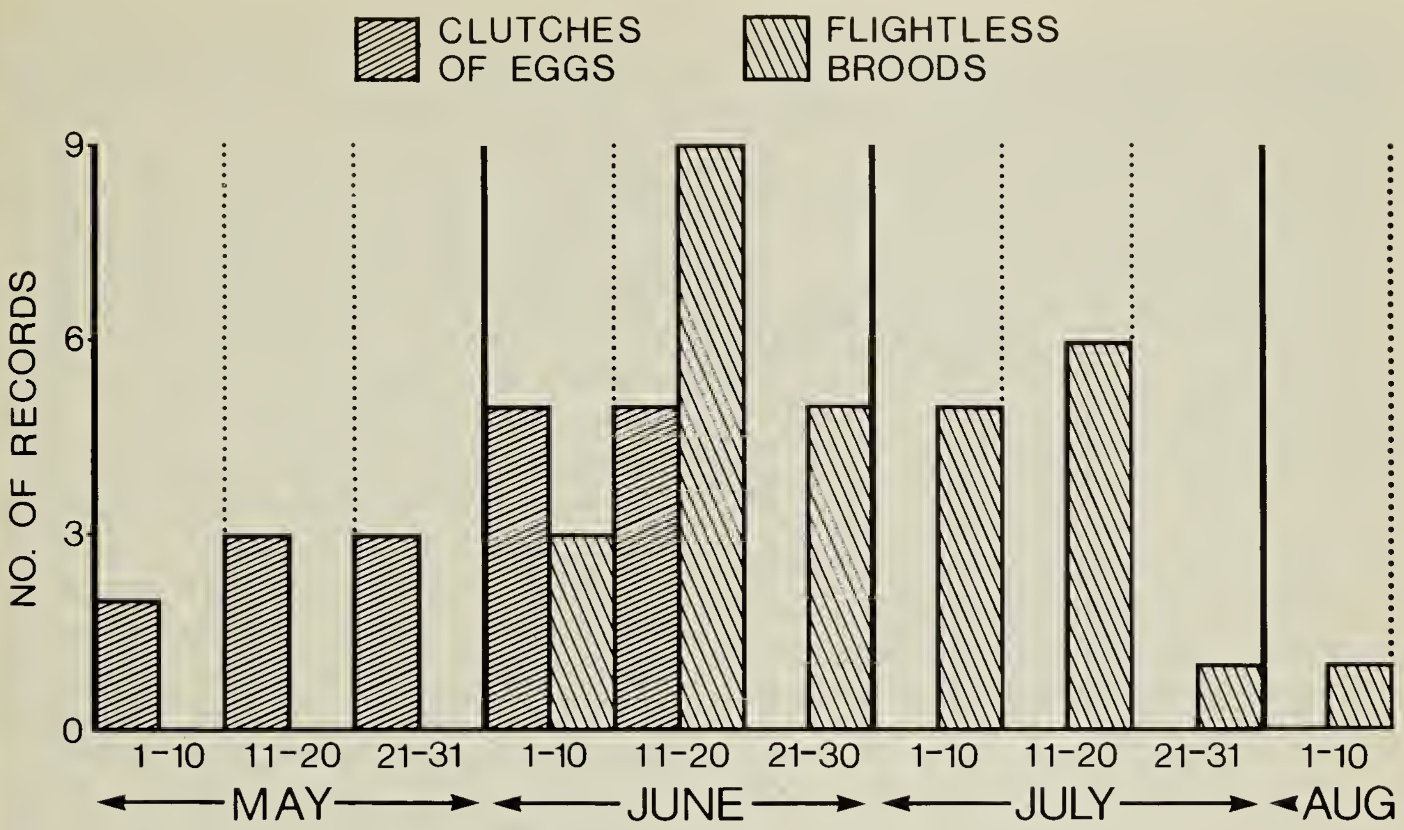


Figure 2. Temporal distribution of records of eggs (13 clutches) and flightless broods (30 records) by 10-day periods. Observations of eggs at two nests spanned several weeks (17 May-19 June; 28 May-12 June) and hence appear in several date ranges.

to southeastern Alberta (DN*). Within a week of the first sightings in the extreme southwest, the species has usually arrived at the northern edge of the breeding range near 52° N.

The first spring observations usually consist of small groups of two or three individuals. Of 33 records for April 1960-78 in the Saskatoon area, there was only one group of more than three individuals (five on 22 April); the average group size was 1.7 birds (SNHS). Even in the Val Marie area, where curlews are more common, the largest flocks noted in April were of seven individuals (29 April 1973, 19 April 1976), each flying northwest in an apparent migratory movement (DC*).

Breeding Chronology

Figure 2 shows the temporal distribution of records of clutches of eggs and broods of flightless young. The dates of 13 clutches of eggs for which complete information is available ranged from 10 May (4 eggs) to 19 June (4 eggs and 1 newly hatched chick) — both at Matador (ARS*). Bent listed 11 egg dates for Saskatchewan,[4] five of which are probably included in the above total of 13 clutches, from 3 May to 4 July; six records were from 23 May to 10 June. It thus appears that the height of incubation occurs from about mid-May to mid-June.

The incubation period is not definitely known, but has been estimated at 29 or 30 days.[25] [9] Information on one nest at Matador Grassland indicated an incubation period of about 30 days.[20]

As with most other shorebirds, the normal clutch size is four.[25] Ferry found one set of two well incubated eggs at Quill Lake,[6] and Sadler and Maher recorded one five-egg clutch at Matador.[32]

Pipped eggs have been found as early as 10 June (1979) near Unity (AY*), and fledged juveniles have been observed as early as 5 July (1909) at Quill Lake.[6] In both cases, eggs must have been laid by the first week of May. Maher recorded the latest flightless juveniles at Matador on 5 August (1970).[20]

Young curlews are highly precocial and leave the nest shortly after their natal down has dried. A brood banded at the nest on 12 June 1968 at Matador was found on 18 June more than 6.5 km from the nest site.[32] It is not known, however, if this movement is normal. Curlews apparently remain in family groups until fledging and may flock together with other curlews prior to migration.

Fall Migration

The information on fall migration is fragmentary, probably a result of our location on the periphery of the curlew's breeding range, the general rarity of the species within the province, and the fact that its scarcity is further amplified when widely dispersed family groups and pairs gather together into flocks, thus becoming even more locally distributed.

Family groups probably begin to gather together by mid- to late July, soon after the chicks fledge. It is not known if failed breeders and nonbreeders depart earlier. In the Rosetown-Biggar district, curlews were recorded later than 31 July only once during 1970-79 (WR, GW*, AS*): a flock of 90 was feeding in dry foxtail in the flats of Eagle Creek valley near Harris on 6 August 1979. Previously, no more than five (a family group) had been recorded in late summer at one location. In the Saskatoon district, Long-billed Curlews were seen later than 31 July in only three years during 1960-78 (SNHS-JBG*). The largest flock was of 57 at Rabbit Foot Lake on 2 August 1976; later counts there of 29 on 8 August and four on 10 August suggested that there was a gradual exodus from the lake. Previously, the largest summer flock in the Saskatoon area had been of 19 at Proctor Lake on 4 July 1978; these were attracted by the noisy behaviour of a pair evidently defending their young (JBG*). All other July-August groups at Saskatoon numbered less than five individuals (SNHS). The latest fall record for the province, and the only one for September, was one observed near Blackstrap Reservoir southeast of Saskatoon on 12 September 1971 (JBG*). On the northeastern edge of the range at Quill Lake, Ferry reported the latest fall migrants on 11 August (1909).[6]

Farther south in the province, Long-billed Curlews are observed more regularly in August, perhaps a result of larger local nesting populations and some influx of southbound migrants. At White Bear, on the north bench of the South Saskatchewan River, flocks of 10-24 individuals are seen regularly in mid August, but leave abruptly by the 3rd week of the month (SJ*). A similar pattern of departure was noted at Matador from 1967 to 1972 where flocks began to form in late July or early August; the latest fall observations varied annually from 15 July to 16 August (ARS*).[20] Maher gives no indication of flock sizes, but Roy stated that the largest flock observed within the elbow of the South Saskatchewan River was 40 at Luck Lake on 15 August 1943.[31]

Departure data from the southwest and south-central areas Is less complete. In the Moose Jaw area, curlews often go unreported in August: the largest fall flocks were 30 at Pelican Lake on 12 August 1973 and 12 at Old Wives Lake on 5 August 1975 (LK*). The latest departure date is 20 August (1972—LK*). In the Cypress Hills/Frenchman River area, the largest flock, consisting of at least

Long-billed Curlew *Wayne Lynch*

100 curlews, was seen at Junction Reservoir on 19 August 1976 (BL*). Taverner saw a flock of 100 at Many Island Lake on the Alberta-Saskatchewan border on 8 August 1920.[28] These are evidently the largest concentrations known for the province or immediate vicinity. (*Ed. Note:* A flock of at least 140 was studied by JBG on 27 July 1980 on a slough about 10 km (6 mi.) west-northwest of Ardath, Sask.) The only other comparatively large flock recorded in the literature was of 100 at Medicine Hat, Alberta, on 2 August 1920.[28]

Bent listed 6 August as the latest fall record for Eastend,[4] presumably on the basis of Potter's observations which began in 1901. However, several later observations (the latest: 26 August at Junction Reservoir — ARS*) have subsequently been made, aside from the large flocks listed above. The paucity of observations in the southwest points out the extremely local distribution and/or scarcity of the species in August. In contrast, in the Medicine Hat region of southeastern Alberta, "[from 1958-1969] late summer flocks of 10-20 were fairly common throughout August. No observations were recorded after the third week of August" (DN*).

In southeastern Saskatchewan, Long-billed Curlews are extremely rare in late summer and early fall, suggesting that very few migrate southeast from breeding areas in western Saskatchewan.

Habitat

During spring migration (April to early May), Long-billed Curlews usually confine themselves to dry upland prairies both near, and at some distance from, water bodies and water courses. In the eastern part of the province, where extensive grasslands are scarce, curlews are usually seen in company with other shorebirds at sloughs and runoff ponds (e.g., Regina[2]). In spring migration, the curlew is also often seen in fallow and stubble fields. It is not, however, very much of a "shorebird" during its period of residence in Saskatchewan.

During the nesting season, the Long-billed Curlew apparently prefers prairies, either moist or dry. Bent noted that north of the Cypress Hills, the curlew showed "a decided preference for damp, grassy hollows in the prairie, or long slopes near lakes or watercourses."[4] At Matador, the species nests in dry, open prairies; shortly after hatching, the chicks move to areas with greater cover, if available.[20] In parts of its range (e.g., Saskatoon — SNHS; Rosetown-Biggar;[29] White Bear — SJ*; Burstal-Richmound — GA*) it is also reported in fallow and stubble fields, and in forage crops or grain crops, usually where these abut prairies or shrublands; their behaviour frequently suggests that eggs or young are present. The only definite nest records in stubble and summerfallow fields are from White Bear; "the curlew tends to nest on cultivated ground . . . the young are usually wandering in the fields at spraying time" (SJ*). It is possible that many of these observations represent adults tending broods that were hatched in grasslands, and which later wandered into nearby croplands. The Long-billed Curlew is rare or absent as a breeder in large areas under complete cultivation, except that Belcher has a possible breeding record, based on the behaviour of two adults on 12 June 1959, in a stubble field on the well cultivated Regina Plains.[2] In adjacent North Dakota, the Long-billed Curlew has not been recorded breeding in agricultural habitats.[35]

Some observers have noted the complete absence of breeding curlews in areas of seemingly suitable prairie habitat throughout the Saskatchewan range (MG*).[31] None has been found nesting in the fescue prairies on the upper escarpment of the Cypress Hills, where they have possibly never nested due to a heavy grass cover (MG*, WH*).[3 8] Even where curlews do nest regularly, such as at Matador, the densities are low (1 pair per 6 or 7 km^2) compared to densities in parts of the United States.[32] Either the existing habitat in Saskatchewan is being under-utilized for unknown reasons, or much of the habitat is of marginal value for breeding. Many factors besides those on the Saskatchewan breeding grounds may be responsible for the small numbers now present there, as has been suggested for the Burrowing Owl.[40]

During fall staging and migration, the Long-billed Curlew occurs more frequently near lakeshores and river valleys; but even then they are more often seen feeding in dispersed flocks at some distance from the shorelines.

Distribution and Abundance to 1950

The long history of ornithology in Saskatchewan has given us much information on the early distribution of the province's Long-billed Curlews. While most early bird work took place in central Saskatchewan, the lack of records of curlews by many of the early residents there leaves little doubt which areas were beyond the species' pre-settlement range. Richardson did not record the species at Fort Carlton or in areas of the Saskatchewan and North Saskatchewan rivers downstream from there in May 1820.[16] Drummond, who was present at Fort Carlton from 5 April to 14 July 1827, and Bourgeau, who was present there in the spring of 1858 until 19 June, also failed to record the Long-billed Curlew.[16] Coubeaux, who homesteaded in the Duck Lake and St. Louis districts from November 1893 to 1903, never saw this species.[16]

However, at Osler (only 57 km south of Fort Carlton and 52 km southwest of Duck Lake), W. C. Colt reported the Long-billed Curlew as "common" and "breeding" in 1893.[14] In 1909, Ferry found it "abundant" at the Quill Lakes where he located one nest and at least two broods; while no actual counts were taken, he noted that during their several-week stay "their loud cries were constantly in [their] ears".[6]

Pre-1950 records from areas at the same latitude nearer to the Alberta border are scarce. Long-billed Curlews nested regularly in the 1930's and 1940's near Struan, Saskatchewan (EJ*, WJ*). Symons' most northerly record during extensive travelling in southern Saskatchewan was on 12 June 1931 when he took a set of four eggs from a boy at Cactus Lake.[37] The most northerly record for the pre-1950 period was one observed by Will Neave at Evesham near the Alberta border on 3 May 1922 (*Family Herald and Weekly Star*, Montreal, 14 June 1922, p. 42).

The first indication of a decline along the northern edge of the range was in July 1924-26 when Munro visited the Quill Lakes and failed to record a single curlew.[23] Then in 1932, W. E. Clyde Todd, while in Saskatchewan on a collecting trip for the Carnegie Museum, reported more fully on their decline in areas to the south.[39] He remarked, presumably on the authority of Reuben Lloyd who had lived in the Davidson area since 1904,[13] that the Long-billed Curlew was a "summer resident, once common, but becoming rare and local." It was by then so locally distributed in south-central Saskatchewan that Todd failed to see a single curlew at the Quill Lakes or at Last Mountain Lake during what should have been the height of the breeding season. The only ones seen were along the South Saskatchewan River near Elbow where seven specimens were eventually collected:

> "On the wide plains west of the Saskatchewan River we had hoped to find a colony established, but after a long search could discover but three individuals. I picked up a young bird in the down. The parents made a great outcry, and swept downward repeatedly. Two days later we secured one of the adults; and on July 22 Mr. Lloyd returned to the same area and collected a few adult and immature birds".[39]

In southeastern Saskatchewan, as in southwestern Manitoba,[38] the species was probably never common, even in pre-settlement days. The earliest record for the southeast was a specimen collected at Indian Head in 1892.[5] Curlews, not otherwise specified to species, were observed at Indian Head on 10 and 11 May 1903 by George C. Harvey, and on 9, 11 and 15 May by George Lang.[5] Harvey listed them as rare and not breeding; Lang as common, breeding and "remains all season" (Chandler S. Robbins *fide* C. S. Houston). Indian Head was not listed as a breeding locality in Bent's range description, suggesting that at least by 1929 it was no longer breeding there.[4] The earliest record for the immediate Regina area was in 1941, by which time virtually all the native grassland had been ploughed.[1] Farther

Long-billed Curlew chick less than one day old at Akerlund Lake, probably the northernmost definite breeding area on the continent. 10 June 1979.

Allen Young

southeast in the Wauchope-Redvers area, Nixon recorded the species until at least the 1930's;[24] however, it is not known if it nested locally.

The most complete historical accounts of the Long-billed Curlew's former abundance are from southwestern and south-central regions. In 1891, the egg collector, Walter Raine, found the Moose Jaw area ". . . alive with curlews", and farther west at Rush Lake he noted that curlews were "numerous" on 10-11 June.[27] Moose Jaw was the most easterly locality in extreme southern Saskatchewan where Long-billed Curlews were known to have been even moderately common.

Macoun and Macoun described the species as "common" or "fairly common" at places they visited: "this species was found breeding at Wood Mountain, in June, 1895, and for 150 miles to the west towards the Cypress Hills, upon which numbers were breeding in 1894".[19] North of the Cypress Hills, Bent found curlews "tolerably common in scattered pairs on the prairies" in 1905 and 1906.[6] Williams, however, listed few observations in extreme southwestern Saskatchewan and adjacent Alberta in spite of intensive field work carried on for the Geological Survey of Canada in the summers of 1924-26.[41]

Laurence Potter, resident naturalist in the Eastend-Ravenscrag area from 1901 to 1940, provided some of the longest continuous coverage of bird distribution in the Cypress Hills area. In 1920, Potter's impressions of declining numbers of curlews were first noted in the "Natural History Club" section of the *Family Herald and Weekly Star*, Montreal (15 September):

> "It is regrettable to note a diminution in numbers of certain prairie-dwelling birds, particularly the Long-billed Curlew, which is now almost extinct."

Potter's observation elicited a response from S. J. Darcus who noted in a letter published in "Natural History Club" on 8 December 1920:

> "I am glad to be able to state that in the part of the Cypress Hills in which I was last spring, I met with the long-billed curlew and found several nests of that species . . ."

Potter's impressions of decline were no doubt to some extent echoed in Mitchell's remark in the first *Birds of Saskatchewan* that the Long-billed Curlew was "apparently decreasing in numbers in some parts".[22]

In 1930, Potter further noted that "twenty-five years ago the Long-billed Curlew swarmed everywhere; today it has become a rarity in the [Frenchman] valley, but a few may yet be seen on the prairie [i.e., the upper benches above the valley]."[26] Potter's field-notes from the spring of 1920 stated "getting scarcer", in fall 1920 "very scarce this summer", in spring 1921 "getting much scarcer", in fall 1923 "a slight but marked increase in numbers this year" and in spring 1924 "seems to be increasing again" (MG*). M. Gollop* notes that Potter's relative immobility[15] may have given rise to a very local impression of curlew scarcity, for observers elsewhere in the Cypress Hills area continued to find the species well distributed.

In 1948, Godfrey found Long-billed Curlews "not uncommon on the prairie both south and north of the Cypress Hills"; his maximum counts included 12 between lower Cypress Hills and the Montana border on 8 July, and 11 between Gull Lake and Antelope on 15 July.[8] Soper provided some of the most detailed accounts of its abundance in southern and southwestern Saskatchewan during field work from 1920 to 1946; he found the largest numbers in the vicinity of Duncairn Reservoir southwest of Swift Current:

> "Present in moderate numbers, July 17-24 [1946]. On the 21st, a dozen were seen . . .; meeting with from two to six daily was of common occurrence. A local rancher, Mr. George Ecker, told me that on July 16 he had seen a total of 35 of these curlews in the general neighborhood of Duncairn Reservoir and that during the breeding season a goodly number occupied the high, virgin plains not only in this locality, but also out from Vesper, Simmie and Lake Pelletier and southwest in the Swift Current Creek territory. Ecker said that in the overall Duncairn Lake district he had seen at least 100 of these curlews in the spring and to his knowledge they had nested there for at least the past 40 years."[34]

Figure 3 summarizes the distribution of the Long-billed Curlew. The northern edge of the historic breeding range closely paralleled the aspen parkland/mid-grass prairie boundary. However, as settlement of the grasslands accelerated in the early 1900's, the Long-billed Curlew became locally scarce, especially in eastern and northeastern areas of its former range. Records by Harrold for Old Wives Lake in 1922,[10] Potter in the Cypress Hills in the 1920's,[26] Williams in southwestern Saskatchewan and southeastern Alberta from 1924 to 1926,[41] and Symons' statement that "they became very scarce some thirty-five years ago [i.e., about 1932], but seem now to be once more well established"[37] suggest that a decline in many parts of the Saskatchewan breeding range in the 1920's and early 1930's may have been followed by a local resurgence of numbers. However, as later observations

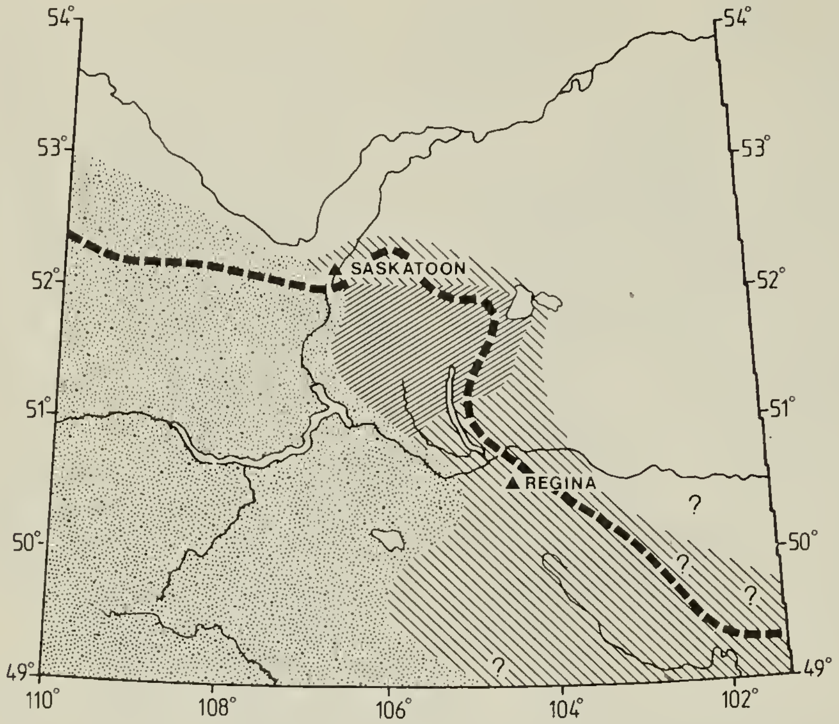

54°
53°
52°
51°
50°
49°
110°
108°
106°
104°
102°
SASKATOON
REGINA
?

Figure 3. Distribution of the Long-billed Curlew in Saskatchewan.

░ regular breeder; rare to locally fairly common
▨ very rare, irregular breeder; formerly much more common
▧ very rare spring transient or summer visitant; formerly a regular breeder
▬▬▬▬ mid-grass prairie/aspen parkland boundary

showed, the recovery failed to occur in all eastern and at least some western areas.

Distribution and Abundance, 1950-1979

Unlike eastern Saskatchewan, there has been little change in the breeding range of the Long-billed Curlew in western parts of the province during this century. In the 1910's, the species nested north to approximately the southernmost bend of the North Saskatchewan River.[14] In 1977, Long-billed Curlews were seen, and probably breeding, near a Ducks Unlimited project south of Marsden at 52° 47' N, the northernmost record for the province (HdeV*). On 10 June 1979, a nest with four eggs was found at Akerlund Lake, 11 km northwest of Unity; one other pair appeared from their behaviour to be nesting in the area (AY*). This location is somewhat north of the known breeding range in Alberta.[33] Additional sightings in the Unity-Kerrobert area near White Heron Lake (AS*), Salvador (AY*), Muddy Lake (WR, KF*) and Tramping Lake (WR) suggest that the species is widely distributed in low numbers; observations at Salvador and Tramping Lake consisted of pairs vigorously diving in apparent defense of eggs or young. The discovery of a nest with four eggs at Cactus Lake on 10 May 1978 (AY*) indicates that curlews still nest where Symons found his most northerly breeding pair in the early 1930's.[37]

Long-billed Curlews were noted as uncommon breeders throughout the Rosetown-Biggar area in the 1970's (GW*, AS*,[29]). While usually only scattered pairs were seen there, a total of nine adults attracted by the capture of two young 14 km southwest of Harris on 18 June 1978 indicates that aggregates of pairs may occur in some areas. At Struan, the Long-billed Curlew is now less frequently observed than formerly, although it was still present, and presumably nesting, as late as the mid-1970's (EJ*).

In the Saskatoon area, curlews nest locally on a few large tracts of uncultivated or intermittently cultivated prairies and parklands south and southwest of the city. There has evidently been a slight retraction of their range and probably a more marked decline in their numbers in the area in the past 75 years. Long-billed Curlews no longer nest northeast to Osler where Colt recorded 25 on the first day it was seen during spring 1893.[14] In spite of greater mobility, better field equipment and dozens of competent observers, the members of the SNHS never observed more than 12 in a day (May Day Bird Count — 27 May 1978) nor were more than 10 seen in one day by one observer (8 May 1971, 1 June 1978) during spring from 1960 to 1978 (SNHS). Few curlews now occur anywhere northeast of Saskatoon and none has been observed recently in the Osler area (see inset, Fig. 1).

North of the South Saskatchewan River — Qu'Appelle River area some of the more significant breeding populations occur in parklands southwest of Biggar (AS*), along Eagle Creek (probably intermittently throughout its entire length — SNHS,[29]), at White Heron Lake southeast of Kerrobert (AS*), the Missouri Coteau near Elbow,[31] the upper benchlands along much of the South Saskatchewan River from the Alberta border to near Saskatoon (SNHS, SJ*, GF*,[21 31]), and along the upper Qu'Appelle Valley from the Qu'Appelle dam to near Buffalo Pound Lake (GA*, DH*, WH*, LK*, [18 11]). The species is regarded as very rare (RF*, GF*) to uncommon (JBG*) in the large community pastures in the Kindersley area. The largest number reported in that area was a group of 6-8 in a PFRA pasture between Glidden and the South Saskatchewan River in July sometime between 1954 and 1959 (JBG*).

The range of the Long-billed Curlew in eastern Saskatchewan (approximately east of 106° W. Long.) has undergone the most marked change in the past 100 years. Table 2 summarizes all known records in eastern Saskatchewan. The only areas of eastern Saskatchewan where curlews now nest regularly are near the upper Qu'Appelle Valley, Moose Jaw and Old Wives Lake (LK*,[11 18]). Its status in the Big Muddy area is unknown, although it is doubtful that large numbers have gone unreported there. At the Quill Lakes, there are only a few recent records (Table 2), and recent field trips to the area (e.g., SNHS summer meet to the north end of Big Quill Lake in 1975,[30]) have failed to record the species. However, a small number of post-1950 observations during May and June suggest that some may still breed in the extensive prairies between Quill and Last Mountain lakes.

The curlew is now only an irregular spring transient in the Regina and Qu'Appelle River areas.[2 5] Farther south it is rare or absent. R. Luterbach*, who lived in the Lampman-Estevan area in the 1950's and 1960's, did not record this species. Stoudt did not see Long-billed Curlews and during a 14-year study (1952-65) of factors affecting waterfowl production in the Redvers area.[36] Knapton did not see curlews in the extreme southeastern part of the province during intensive investigations from 1974 to 1978, although some relatively large tracts of uncultivated grassland still existed.[17]

Long-billed Curlews are still locally fairly common throughout the southwest, south of the South Saskatchewan and Qu'Appelle rivers, and west of 106° W. Long., although a continued recent decline has been noted in some areas. South of Val Marie, Long-billed Curlews were "quite abundant and regular residents . . . 20 years back [i.e., about 1959]"; today they are thinly distributed and often go unrecorded during a day's travel where they were once numerous (DC*).

TABLE 1: Some dates of earliest spring arrival of the Long-billed Curlew in Saskatchewan and southeastern Alberta.

Area	*Average Date (No. Yrs.; Period)*	*Earliest Date*	*Source*
SASKATCHEWAN			
Cypress Hills	17 Apr. (55;1907-78)	10 Apr.	MG*, SM, LP, JWi*
Val Marie	18 Apr. (27;1940-79)	8 Apr.	DC*
Saskatoon	24 Apr. (16;1960-78)	12 Apr.	SNHS
Rosetown-Biggar	24 Apr. (8;1970-79)	16 Apr.	DHR*, WR, AS*, GW*
Struan	26 Apr. (18;1940-74)	14 Apr.	EJ*, WJ*
SOUTHEASTERN ALBERTA			
Medicine Hat	16 Apr. (12;1958-69)	*16 Apr.	DN*

TABLE 2: Records of the Long-billed Curlew in eastern Saskatchewan. Map numbers refer to Figure 1.

Map No.	*Locality*	*Date (No. Seen)*	*Observer(s)*	*Source of Record*
1.	Indian Head	9 May 1904—spring arrival date	GL	Bent 1929
2.	Indian Head	1892	WS	Smith 1914 in Callin 1980
3.	Indian Head	10-11 May 1903 (1) [species ?]	GH	Callin 1980
4.	Quill L.	summer 1909	JF	Ferry 1910
5.	Regina Beach, Last Mountain L.	27 June 1933 (female col. — SMNH)	FB	KR*
6.	York L.	22 May 1938 (1)	IP	Houston 1949
7.	Wauchope-Redvers	"up to 1939"	MN	Nero & Lein 1961
8.	E of Fife L.	4 July 1940 (1)	JDS	Soper 1970
9.	Regina	1941 (1)	EF	Belcher 1961
10.	Little Manitou L.	15 June 1943 (2)	JDS	Soper 1970
11.	between Frobisher and Estevan	5 May 1946 (1)	JDS	Soper 1970
12.	Regina	17 April 1948 (1)	FB	Belcher 1961
13.	Brora	3 May 1949 (1)	TB	Belcher 1961
14.	Grenfell	1 May 1951 (1)	"Hubbard"	Callin 1980
15.	Grenfell	16 May 1954 (2?)	"Hubbard"	Callin 1980
16.	6 km E of Stoughton	27 July 1954	?	*Blue Jay* 12:21-22
17.	Abernethy	27 April 1959	"Storer"	Callin 1980
18.	Regina	26 May 1959 (1)	FL	Belcher 1961
19.	Jameson	12 June 1959 (2)	?	Belcher 1961
20.	Grenfell	14 June 1961 (1)	"Hubbard"	Callin 1980

Map No.	Locality	Date (No. Seen)	Observer(s)	Source of Record
21.	E of Regina	1 May 1962 (1)	LM	MB*
22.	Regina	2 May 1962 (1)	WF	MB*
23.	Regina	9 May 1962 (2)	DEW, DRW	MB*
24.	Regina	26 April 1963 (2)	MB, DRW	MB*
25.	Regina	4 May 1963 (1)	RPo, DEW, DRW	MB*
26.	Strawberry L.	5 May 1963 (1)	"Nero & Wade"	Callin 1980
27.	Strawberry L.	26 May 1964 (1)	"Nero & Wade"	Callin 1980
28.	White City	8 May 1966 (1)	RT	*Am. Birds* 20:521
29.	16 km S of Bethune	24 June 1968 (1 male collected — ROM)	JD	DR*
30.	Regina	16 April 1971 (1)	RR	MB*
31.	21 km E of Regina	13 May 1972 (1)	"Belcher party"	MB*
32.	Regina area	2 May 1973 (1)	FS	MB*
33.	Lumsden	June 1974 (1)	?	BBS
34.	Regina	3 May 1975 (2)	RD	MB*
35.	near Tutagwa	6 May 1975 (1)	DH	DH*
36.	Goose Ck. near Rock Glen	July 1975	GA	GA*
37.	Coronach	23 Aug 1975 (2)	GA	GA*
38.	7.5 km W of Semans	21 May 1976 (1)	WH	WH*
39.	S end Big Quill L.	23 May 1976 (1)	WH	WH*
40.	11 km S of Bethune	3 July 1977 (1)	WH	WH*
41.	7 km S of Dafoe	summer 1978 (1)	GA	GA*
42.	13 km NE of Southey	12 May 1979 (1)	WH	WH*
43.	Kutawagan L.	29 May 1979 (1)	WH	WH*

In the Cypress Hills area, curlews are fairly common in the extensive short-grass prairies of the 'Gap', the upper slopes of the east block of the Cypress Hills, the Frenchman River both above and below Val Marie, and probably in the heart of Boundary and Old Man On His Back plateaus (DC*, MG*). Two observations from the Cypress Hills area indicate that local aggregations of breeding curlews still occur. On 13 June 1976, several were observed in the 'Gap' about 22 km WSW of Maple Creek:

> "A Red-tailed Hawk was seen flying for about 1.5 km in a straight line over a series of mixed fields (crop, forage, pasture). When first seen, it was being chased by a single calling curlew. As the hawk passed over the fields, one after another single curlews rose and joined the chase. When lost of view a total of seven curlews were following the hawk" (ON, JWe*).

The same day, they saw two other pairs within 16 km of this sighting. On 19 July 1979, a total of 12 adult and 9 flightless young in three broods were seen 13 km north of Govenlock (SL*, WH*).

Population levels within the Great Sand Hills are poorly known. Bent found the species well distributed south of the sandhills near Big Stick and Crane lakes in 1905-06.[3] They were noted as "fairly common — often two pairs protesting at once" in the Burstall-Richmound area to the west in summer 1978 (GA*). On 6-7 June 1979, single pairs exhibiting territorial

Long-billed Curlew nest with eggshell *Wayne Lynch*

behaviour were seen 21 and 24 km SW of Leader on the western edge of the sandhills (PT, RC — JBG*). (*Ed. note:* During field work from 23 May to 18 August 1978, curlews were reported at four of nine study blocks. H. T. Epp and L. Townley-Smith. 1980. *The Great Sandhills of Saskatchewan.* Saskatchewan Environment, Regina. 156 pp.)

So, by the late 1970's, the Long-billed Curlew had been reduced to the status of a very rare breeder or spring transient throughout most of its former range in Saskatchewan east of 106° W as part of a general westward shrinking of the species' range in North America.[25] In western Saskatchewan, it is a locally rare to fairly common breeder in large areas of grassland north to the southern edge of the aspen parklands near 53° N. Throughout the southwest, where probably the largest provincial breeding population existed in the 1800's, the species is still locally common, although its continued decline to the present has been suggested by many observers. Because of its dependence on the primeval grasslands, it seems likely that even there the Long-billed Curlew has suffered marked declines both as a result of the alteration of prairie habitats (e.g., overgrazing, replanting of non-native grasses) and the more disruptive effects of cultivation. Undoubtedly loss of habitat has been one of the major factors that caused, and continues to cause, a decline in the Long-billed Curlew populations in Saskatchewan. One regrets the lack of any quantitative information on such population changes. Proposed monitoring of population levels of the Long-billed Curlew by the Canadian Wildlife Service (RF*) may provide baseline information against which to assess future changes in numbers.

Summary

LONG-BILLED CURLEW. Summer resident, formerly throughout the prairie and southern parkland regions of Saskatchewan north to Marsden, Struan, Osler, Big Quill Lake; east to at least Indian Head and probably to Estevan and Weyburn though without definite evidence of breeding. Present range west of 106° W is similar to historic range (except absent at Osler). East of 106° W, now breeds regularly only near Moose Jaw, Old Wives Lake, Buffalo Pound Lake, possibly Big Muddy Valley; probably irregularly in Last Mountain Lake and Quill Lake areas. Now only a rare, irregular spring transient in Regina, central Qu'Appelle Valley, Estevan, Weyburn.

Dates of occurrence range from 8 April to 12 September. Earliest spring arrivals average 17-18 April in the southwest (49° to 50° N) and 24-26 April near the northern edge of the range (51° to 53° N). Spring groups consist of 1-7 individuals. Egg dates range from 3 May to 4 July, mainly mid-May to mid-June. Flightless broods may occur until early August. Fall exodus begins by late July and is completed in most areas by the 3rd week of August when flocks of 90-100 may occur.

It usually inhabits short-grass and mid-grass prairies during breeding season; occurs during the spring migration and nests occasionally in fallow, stubble, planted grain crops, and fodder fields. In August, it occurs more regularly near lakeshores and river valleys.

Acknowledgements

I am grateful to the many correspondents listed in this paper who took the time to reply to letters requesting unpublished information on the Long-billed Curlew. Their meticulous record-keeping and willingness to compile observations has provided a rare opportunity for a thorough evaluation of the species' status and distribution in Saskatchewan.

I especially wish to thank those who provided complete copies of records from the files of local natural history groups, organizations or museums: Margaret Belcher for the Regina area (files of the Regina Natural History Society); Bernie Gollop for the Saskatoon area (files of the Saskatoon Natural History Society; also BBS and Prairie Nest Record Scheme reports); Mike Gollop for the Cypress Hills; Leith Knight for Moose Jaw; Dorothy Richardson for ROM; Keith Roney for SMNH; and Alan Smith for the Matador Grassland. Copies of Harvey's, Lang's and Potter's spring migration schedules were provided by Stuart Houston (originally courtesy of Chandler S. Robbins). Stuart and Mary Houston's comments on the historical changes in Long-billed Curlew populations, gained from personal observations and from their indepth knowledge of the ornithological literature, are gratefully acknowledged.

Comments on an early draft of the manuscript were made by Bernie Gollop, Stuart Houston, Wayne Harris and W. John Richardson. Allen Young generously provided information and colored slides to document the breeding records near Unity. The technical support provided by LGL Ltd. — environmental research associates in the preparation of this report is greatly appreciated.

OBSERVERS, CORRESPONDENTS AND INSTITUTIONS LISTED IN THE TEXT

GA : Anweiler, Gary;
FB : Bard, Fred G.;
LB : Beckie, Lawrence;
MB : Belcher, Margaret;
TB : Beveridge, Thos M.;
BBS : BREEDING BIRD SURVEY;
RC : Caldwell, Robert;
DC : Chandler, David;
HdeV : DeVogel, Hans;
JD : Dick, J. A.;
DTRR : DEPARTMENT OF TOURISM AND RENEWABLE RESOURCES;
RD : Donison, Robyn;
ED : Dutton, E. J.;
JF : Ferry, John;
RF : Fife, Richard;
KF : Finley, Kerwin J.;
WF : Flemming, William;
EF : Flock, Elizabeth;
GF : Fox, Glen;
JBG : Gollop, J. Bernie;
MG : Gollop, Michael A.;
WH : Harris, Wayne C.;
GH : Harvey, George C.;
DH : Hjertaas, Dale;
EJ : Jasper, Ernest S.;
WJ : Jasper, William E.;
SJ : Jordheim, Sig O.;
LK : Knight, Leith M.;
FL : Lahrman, Fred W.;
SL : Lamont, Sheila M.;
GL : Lang, George;
BL : Lyon, Bruce;
SM : Mann, Steve A.;
LM : Murray, L. H.;
DN : Neiman, Dan J.;
ON : Nielsen, J. O.;
MN : Nixon, Marion;
RPe : Peart, Robert;
LP : Potter, Laurence B.;
RPo : Pough, Richard;
PFRA : PRAIRIE FARM REHABILITATION ADMINISTRATION;
IP : Priestly, Isabel;
RR : Rafuse, Robert;
DHR : Renaud, Don H.;
WR : Renaud, Wayne E.;
DR : Richardson, Dorothy;
KR : Roney, Keith (SMNH);
ROM : ROYAL ONTARIO MUSEUM;
SMNH : SASKATCHEWAN MUSEUM OF NATURAL HISTORY (REGINA);
SNHS : SASKATOON NATURAL HISTORY SOCIETY;
AS : Schmidt, Adam;
ARS : Smith, Alan R.;
JDS : Soper, J. Dewey;
WS : Spreadborough, William;
FS : Switzer, Frank;
PT : Taylor, Phil;
RT : Tempel, R.;
DEW : Wade, Dorothy E.;
DRW : Wade, Douglas R.;
GW : Wapple, Guy J.;
JWe : Wedgwood, James A.;
SW : Wedgwood, Shirley L.;
JWi : Wilkinson, Jack;
AY : Young, Allen G.

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THE GRAY-CROWNED ROSY FINCH IN MANITOBA AND VICINITY

BRIAN N. TURNER and PETER TAYLOR, Pinawa, Manitoba, R0E 1L0.

The Gray-crowned Rosy Finch is a medium-sized fringillid with a range stretching from the islands of the Bering Sea, to as far south as central-eastern California.[4 9] The breeding range in Canada includes southwestern Alberta, all of British Columbia except the northeastern quarter, and extends to the central Yukon. The easternmost limit of the usual winter range includes southern Alberta and extreme southwestern Saskatchewan. Curiously, for a bird which typically spends its summer at the higher levels of mountain ranges in the Rockies and farther west, the first rosy finch to be discovered, and subsequently described, was a specimen taken near Carlton House, Saskatchewan, in May 1827 (Swainson and Richardson[41], cited in Bent[4]). Our sighting of this species in extreme southeastern Manitoba in November 1978 prompted a search for other Manitoba records, and ultimately to a summary of all known records of the species east of the normal winter range in the northern Great Plains.

A Gray-crowned Rosy Finch spent the 1978-79 winter at Pinawa, Manitoba, where it was seen on many occasions by several experienced observers from 20 November to 30 March. Since these observations constitute only the ninth record of this species in Manitoba in nearly 90 years (Table 1), and are the only series of sightings throughout a winter, they are described here in some detail.

The Pinawa bird was first seen by Nelda Turner at a feeding station on 20 November 1978. It accompanied a flock of Evening Grosbeaks, which are common visitors to Pinawa feeding stations. Having identified the bird from guides at hand, and realizing that it was unusual, she reported the sighting to the senior author and on his advice obtained a series of photographs.[9 31] Two days later, R. W. Knapton, W. Neily and K. DeSmet arrived from Winnipeg to verify the record. They obtained further photographs (Fig. 1) and observed the bird closely to determine that it belonged to the subspecies *tephrocotis*.

The arrival of about 20 cm of permanent snow on 12 November, combined with unseasonably cold temperatures, likely prompted the finch to seek out a feeding station. The overnight temperature was near -30°C, some 20 degrees colder than usual, so that a high-density, fat-rich food supply would be welcome. However, although this was the second coldest winter of the century in southern Manitoba, conditions were no more severe than those usually encountered in parts of the Gray-crowned Rosy Finch's winter range. The Pinawa bird was subsequently observed feeding in temperatures as low as -35°C.

About a week after the original sighting the bird moved about 1.5 km to a different part of Pinawa, where it frequented several feeding stations, including Taylor's. It generally fed on small seeds, not taking the sunflower seeds favoured by Evening and Pine

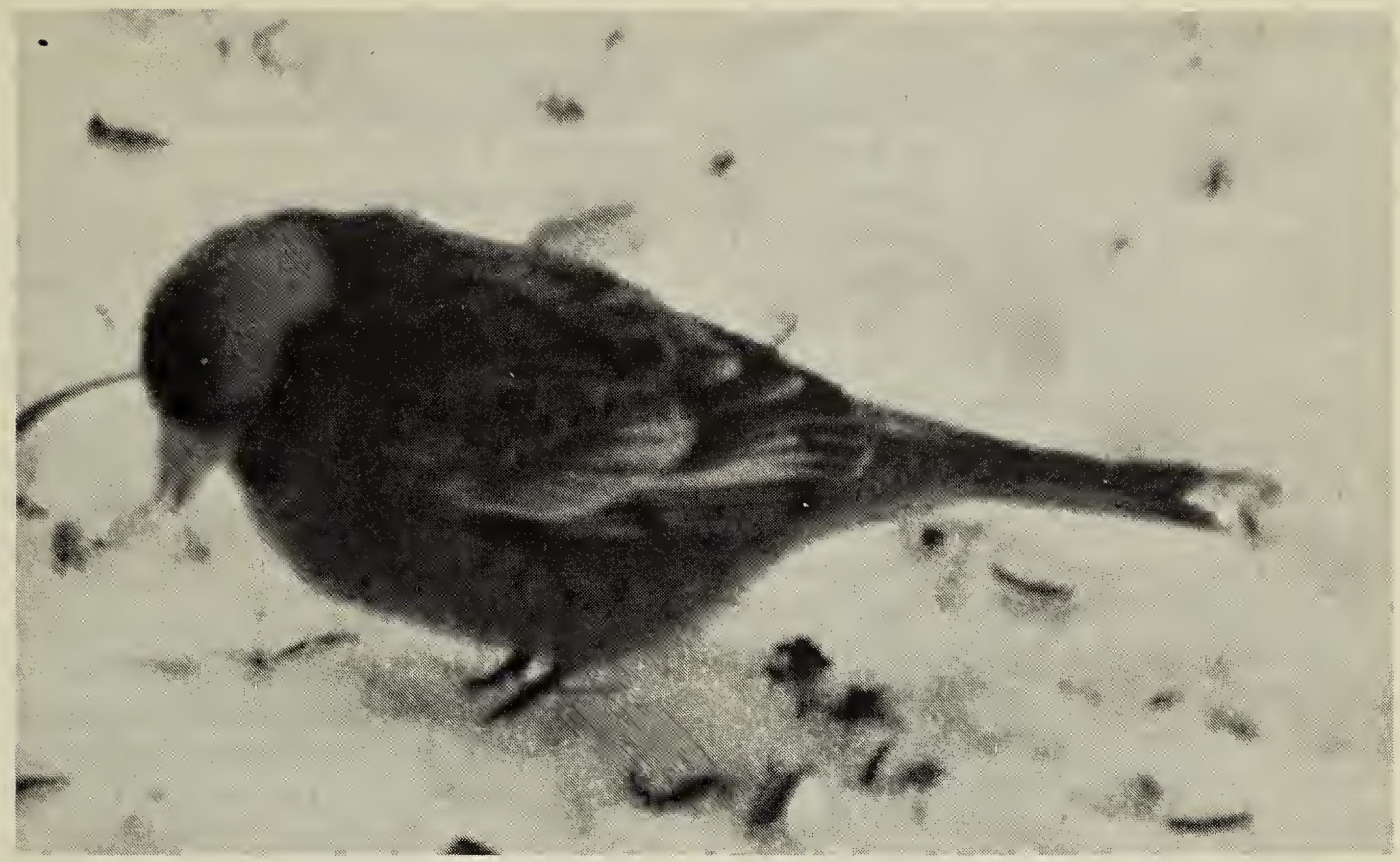

Fig. 1. Gray-crowned Rosy Finch at Pinawa, Manitoba *R. W. Knapton*

Grosbeaks. It was regularly quite aggressive, and would drive away single Evening Grosbeaks which landed on a table when it was feeding. However, it usually took flight when large numbers of Evening Grosbeaks arrived, or else it was relegated to feeding on the ground adjacent to the feeder. Callin and Gross reported aggressive behaviour of Gray-crowned Rosy Finches toward House Sparrows.[5 14] Although the Gray-crowned Rosy Finch is primarily a ground-feeding species, R. Zach watched the Pinawa bird consume birch tree fruits on 26 November, and Taylor observed it foraging in the top of a mature aspen with four male Evening Grosbeaks on 26 February. Rosy finches have been noted for their seemingly fearless behaviour, readily approaching farms for grain and hay, and bird feeders where small seeds are present.[37] Our observations support this description.

In the Pinawa bird, pink colouration was restricted to the edges of the wing feathers, and a suffusion in the flanks and rump. The pink was no more prominent or extensive when the bird was last closely observed on 30 March, and we conclude that it was a female.

"Normal" Winter Distribution

In winter Gray-crowned Rosy Finches migrate to lower altitudes, and move east and south from the breeding range above the timberline in western North America, where they nest on cliffs.[4 9 23] The winter range limit shown in Fig. 2 encloses, to the best of our knowledge, all localities at which flocks of 25 or more birds have been recorded. No records of more than six birds appear to have occurred east of this limit, with the exception of 22 at White Bear, Saskatchewan, during the winter of 1975-76.[15]

The species occurs commonly in winter at lower elevations in southern Alberta, for example, at Brooks and Ralston.[37] It occurs sporadically in extreme southwestern Saskatchewan, (e.g., Eastend, Fort Walsh, Dollard, Ravenscrag, White Bear), sometimes in large numbers: e.g., 40 at Eastend, 9 March 1934[32]; 200 at Eastend, 20 December 1940 (C. F. Holmes cited by Bent[4]); up to 100 at Eastend, and 22 at White Bear, winter 1975-76[15]; 140 at Fort Walsh, 31 December 1976.[20 35] Christmas Bird Count data published in "American Birds" show that the species occurs in much of Montana in winter, and there are records as far east as Fort Peck (40, 3 January 1976[15]) and Miles City (81, 18 December 1976[39]). There are at least four records of substantial numbers in North Dakota, all in the extreme west of the state: 20 on 13 December 1966 in Billings County (E. Bry, fide R. E. Stewart[40]); 25 at Bowman, 19 November 1972[18]; 200 at Medora, 20 December 1975[15 33]; 96 at Medora, 16 December 1978.[40] The regular winter range of this species in South Dakota is shown by Whitney et al. to be restricted to the far west-central portion of the state.[44] They cite many winter records of large numbers within this range. We show a more easterly range limit in South Dakota on the basis of records of 500 at Badlands National Monument and 65 at Scenic.[44] The "normal" winter range then apparently swings south and west to include extreme northwestern Nebraska.[4]

Extralimital Winter Occurrence

The circles on the map in Fig. 2 show all the extralimital occurrences of Gray-crowned Rosy Finches of which we are aware, within the area shown, and east of the "Normal winter distribution" in Saskatchewan and the Dakotas as defined above. Data for these records are given in Table 1. Nearly all of these records are of single birds, showing that they refer to wandering individuals, rather than irruptive movements of the kind associated with many other fringillids which winter in the northern Great Plains. We note however that occurrence just within the range limit, e.g., in southwestern Saskatchewan, appears to be sporadic. A disproportionate number of these records, including four of the nine Manitoba sightings, have occurred in approximately the past decade.

It is difficult to draw conclusions about the distribution of records as a function of distance from the breeding range, since the reports are strongly affected by the human demography of the region. Thus the absence of records from northern Saskatchewan and Manitoba may simply reflect the scarcity of observers. However, there is a decrease in frequency with increasing distance eastward, and the Ontario, Iowa and Minnesota records probably represent the limit of wandering which may reasonably be expected to occur. There is one remarkable, well documented record from the state of Maine.[14] Lawrence stated that several other specimens were present in Manitoba at one time, but their origin appears to be unknown.[26] N. Criddle indicated the species was rare at Aweme, but apparently no details are available.[26] Virtually all extralimital records are for the period late October to early April. There is one surprisingly late record by C. S. Francis of a bird near Nipawin on 3 June 1953.[5]

Notes On Subspecies

Two subspecies of the Gray-crowned Rosy Finch, *L. t. tephrocotis* and *L. t. littoralis* (formerly Hepburn's Rosy Finch[4]), are known to occur in the region of interest. They are readily distinguished in the field, *littoralis* having more extensive gray colouration on the head.[4 9] The *littoralis* breeding range lies to the

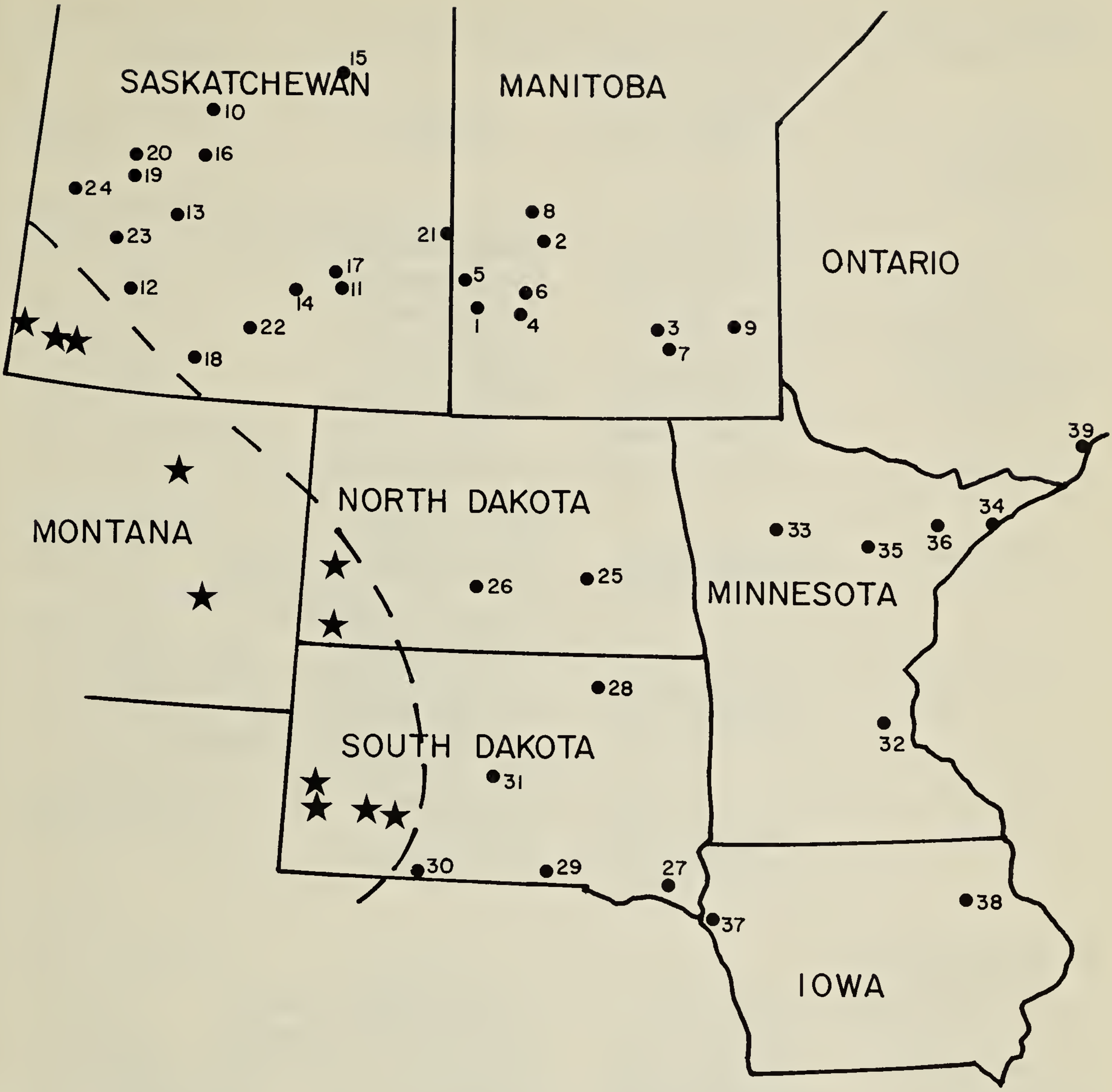

Fig. 2. Eastward extralimital records of Gray-crowned Rosy Finches (shown by circles). Stars show reported flocks of 25 or more birds within the "normal" winter distribution. Numbers refer to Table 1.

northwest of that of *tephrocotis*, and it thus might be expected to occur less frequently on the Great Plains. Few of the records in Table 1 are specific to race, but they appear to bear out this expectation. However, *littoralis* has been recorded as far east as Ontario, Manitoba and Minnesota, as well as the extraordinary Maine bird. There is one record by Potter[32] of a flock of 12 *littoralis* birds at Ravenscrag, Saskatchewan; at least the majority of records of large flocks in southwest Saskatchewan are referable to *tephrocotis*.

Rosy Finches are evidently highly adaptable in being able to live from above treeline in summer, to lowlands and farmyards in winter, and in crossing wide expanses of boreal forest to reach locations such as Thunder Bay, Ontario. Pinawa is located approximately 30 kilometres east of prairie grasslands and farms, in an area of boreal forest, so that surroundings for the bird reported here were somewhat different from the open areas commonly encountered farther west in the winter. Finally, it is not known whether the recent increase in

TABLE 1: Summary of eastward extralimital winter records of Gray-crowned Rosy Finches.

Location	Date	Remarks	Source
A. Manitoba			
1. Birtle	Jan. 1891	One, in collection of Ernest Thompson Seton	26, 38, 42
2. East Bay, Lake Dauphin	18 Nov. 1922	One, apparently *L. t. tephrocotis*	26
3. Stonewall	Nov. 1939	One seen	8, 17
4. Basswood	3 Feb. 1942	One ♀?	27
5. Russell	2, 9 Nov. 1959; 22 Mar. 1960	One seen	1
6. Erickson	13-14 Mar. 1968	One, identified by R. J. Walker, verified by J. A. Crosby	16
7. Winnipeg	22 Dec. 1977 - 8 Jan. 1978	One, observed by Mr. and Mrs. W. Deans, identified by H. W. R. Copland as *L. t. tephrocotis*	8, 17, 25
8. Winnipegosis	10 Feb. to late Mar. 1978	One, observed by R. and G. Coder, identified to subspecies from photograph as *L. t. littoralis*, by W. J. Walley	43
9. Pinawa	20 Nov. 1978 - 30 Mar. 1979	One female *L. t. tephrocotis*	This report
B. Saskatchewan			
10. Carlton (House)	May 1827	Type locality for species	4, 19, 41
11. Indian Head	"Prior to 1924"	"repeated observations"	5, 30
12. Swift Current	25 Nov. 1933	Specimen "taken in district"	22
13. Macrorie	26 Feb. 1938	One seen	36
14. Regina	23 Oct. 1940	One seen	3, 5
	"early winter" 1948	One specimen	3, 5
	19-21 Jan. 1973	One male, photographed, Boggy Creek valley	3
	15 Nov. to 20 Dec. 1975	One, photographed, Wascana Waterfowl Park	3
	Winter 1975-76	One, 40 km north	3
15. Nipawin (Torch River)	early Dec. 1940	One seen, several days	5, 19
	3 June 1953	One seen	5, 19
16. Saskatoon	20 Oct. 1962	One seen	5, 10
17. Fort Qu'Appelle	2 Feb. to 3 Apr. 1963	Two males	5
18. Glentworth	30 Oct. 1963	One *littoralis* seen	7
19. Valley Centre	10-12 Nov. 1973	Four seen	34
20. Biggar	22 Jan. 1974	One seen	34
21. Togo	Feb. 1974	Two seen, 7 km north	29
22. Spring Valley	17-20 Dec. 1975	One seen	15, 35
23. White Bear	Winter 1975-76	Up to 22	15
24. Kindersley	Dec. 1977	One and two seen	21

C. North Dakota			
25. Jamestown	14-18 Dec. 1975	One at a feeder, obs. G. Pospichal	40
26. Bismarck	Jan. 1979	One at a feeder, obs. Dr. Johnson	40
D. South Dakota			
27. Volin	late Dec. 1960 to 15 Mar. 1961	One, photographed	44
28. Aberdeen	14 Nov. 1972 to 1 Feb. 1973	One, photographed	44
29. Burke	2 Dec. 1972 to about 1 Mar. 1973	Six	44
30. Lacreek NWR	26 Oct. 1973	One	44
31. Sheep Mountain	22 Nov. 1973	Two	44
E. Minnesota			
32. Near Minneapolis	3 Jan. 1889	MMNH Sp. No. 216	13
33. Bagley, Clearwater Co.	late Dec. 1967 to Mar. 1968	Two	13
34. Little Marais, Lake Co.	25 Jan. to 16 Feb. 1972	One, photographed	13
35. Grand Rapids, Itasca Co.	28 Oct. 1972	One ♂	13, 28
36. Hoyt Lakes, St. Louis Co.	11 Mar. 1978	One	6
F. Iowa			
37. Sioux City			4
38. Oelwein	Wintered to 18 Mar. 1978		24
G. Ontario			
39. Thunder Bay	31 Mar. 1963	One, photographed (*littoralis?*)	2
	25 Feb. to 25 Mar. 1973	One, photographed (*littoralis*)	11
	31 Jan. 1975	One, photographed	12
H. Maine			
40. Gorham	15 Dec. 1936 to at least 10 Mar. 1937	One, trapped, banded and photographed (*littoralis*)	14

extralimital sightings of this species is due to a larger number of Rosy Finches wandering east, or to a larger number of interested observers. Whichever is the case, indications certainly are that the species occurs occasionally over a wide area, and should be watched for during the winter.

Acknowledgements

We are grateful to W. J. Walley for permission to include the Winnipegosis sighting, to R. W. Knapton for use of his photograph, and to all of the following for their generous assistance with records and literature: M. Belcher, H. W. R. Copland, K.

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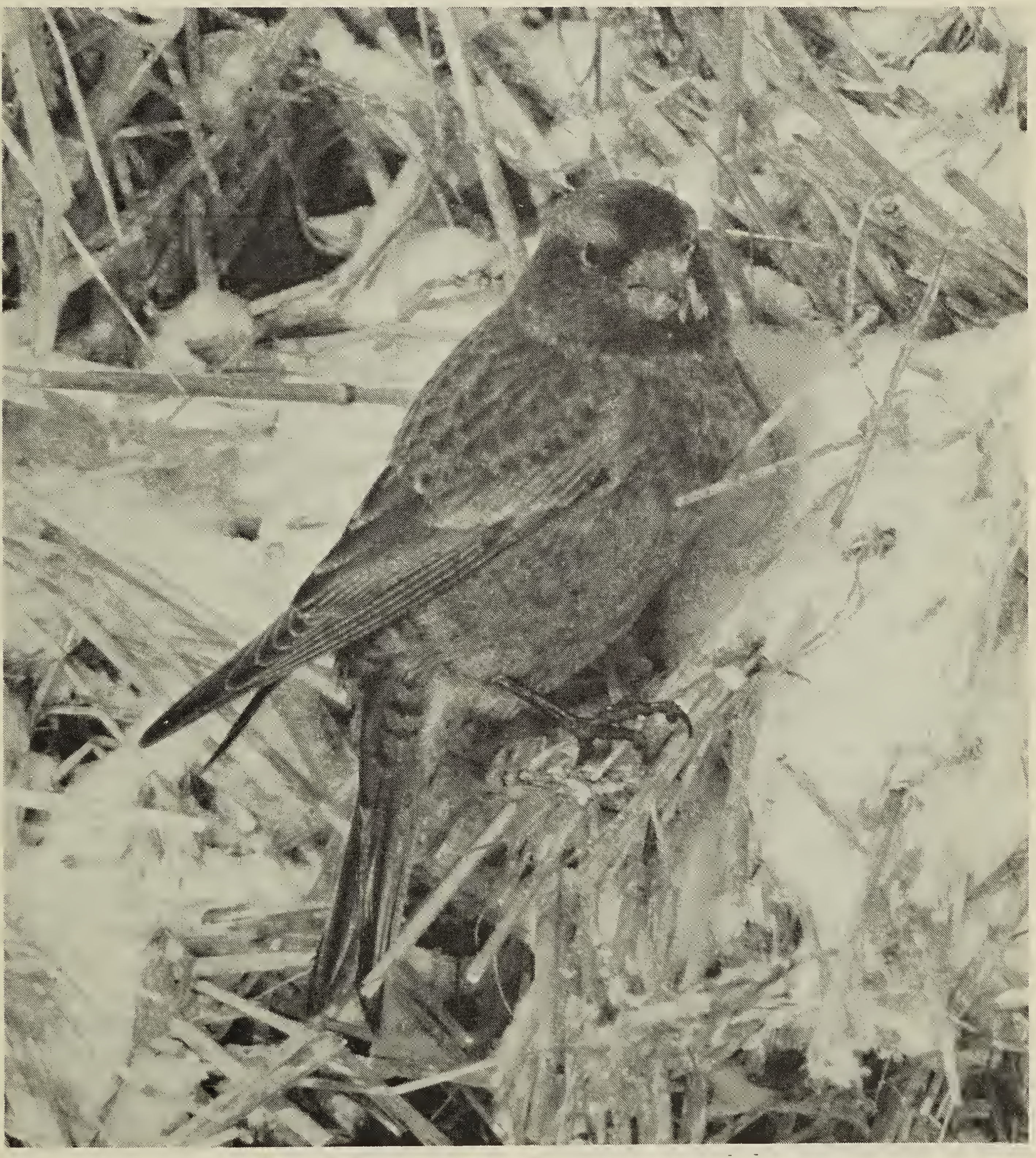

Gray-crowned Rosy Finch foraging on bail stack, Eastend, Saskatchewan, 29 December 1978.

Wayne Renaud

BAY-BREASTED WARBLER NESTING IN SASKATCHEWAN

M. ROSS LEIN, Dept. of Biology, University of Calgary,
Calgary, Alberta, T2N 1N4.

Houston *et al* have noted the lack of adequate documentation of nesting for a variety of birds that are regular summer residents of Saskatchewan.[2] The present note provides documentation for one such species, the Bay-breasted Warbler.

I spent part of the summer of 1969 at the field station of the Department of Biology, University of Saskatchewan, at Emma Lake, Saskatchewan. Bay-breasted Warblers were moderately abundant in mixed woods in the region and two nests were found.

On 8 June a female Bay-breasted Warbler was seen carrying nesting material near the southeast corner of Fairy Island. An incomplete nest was located near the top of an 8-m white spruce (*Picea glauca*), on the tip of a branch about 1 m from the trunk. The female was incubating on 12 June, and on 13 June the nest contained four eggs. The nest was a relatively flimsy structure of twigs and grass. It was empty when visited on 22 June, presumably as a result of predation.

A second nest was found on 13 June in mixed woods near the U. of S. Art School. The female was carrying material to a nest located at a height of 8 m in a 13-m white spruce. On 22 June this nest contained 3 eggs and the female was still incubating when the nest was last visited on 26 June.

The relatively distinctive plumage of the female Bay-breasted Warbler leaves no doubt about the identity of the birds at either nest. Male Bay-breasted Warblers were also seen feeding the incubating females on several occasions at both nests.

There are breeding season records of singing males[1 3 4 5 6] or fledglings[1] of this species from a number of locations in the boreal forest region of Saskatchewan. It seems probable that the Bay-breasted Warbler breeds throughout this region.

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SASKATCHEWAN BREEDING RECORDS FOR RED CROSSBILL, ORCHARD ORIOLE AND RED-HEADED WOODPECKER

STANLEY J. SHADICK, Dept. of Physics, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0, and BOB LUTERBACH, 631 - 65 Westfield Drive, Regina, Saskatchewan, S4S 6A3.

A list of suspected Saskatchewan breeding birds lacking complete documentation has been compiled by Houston, Houston and Gollop[1]. The purpose of this article is to report new 1980 breeding records for three of these species.

RED CROSSBILL. During the winter of 1979 Red Crossbills were moderately common in Saskatoon. When a few crossbills remained on the university campus in April, it was suspected that they might be breeding. About 16 April Stan Shadick noticed a pair in a row of spruce trees behind the Canada Agriculture Research Station. A nest was located about 5.8 m above ground in a spruce tree. Although this nest was checked almost daily at noon, it was not until 23 April that the female Red Crossbill was observed sitting on the nest. On 2 May two young crossbills could be seen in the nest. That evening Bob Godwin, Lawrence Baschak and Stan Shadick attempted to photograph the nest but their 3.6 m ladder was not tall enough. They were able to photograph the adult female when she came to feed the young at approximately one-half-hour intervals. On 5 May there was still at least one young crossbill in the nest. The young were not seen in the nest area when it was checked on 8 May.

ORCHARD ORIOLE. On 30 June Nigel Caulkett and Dale Hjertaas discovered a female Orchard Oriole sitting on a nest 3 km east of the dam on Buffalo Pound Lake. The nest was made of straw and was located 6-8 m above ground in an elm tree. The male oriole was in first-year plumage. On 12 July Lawrence Baschak and Stan Shadick visited the nest location and found one young oriole out of the nest and at least one bird in the nest. Both birds were being fed frequently by the male but the adult female could not be located.

On 15 and 19 June Vic Harper observed a pair of Orchard Orioles at his farm about 20 km NW of Saskatoon. The male was also in first-year plumage. On 14 July it was apparent that the pair was likely nesting. That evening Chris Escott, Ron Jensen, Lawrence Baschak and Stan Shadick joined Vic Harper in a search for the nest. Eventually it was discovered in the branch of a large spruce tree about 5 m above ground. The tree was climbed and two young were observed in the nest. On 16 and 18 July the young were being fed away from the nest. We suspect that this site is the most northerly breeding record in North America.

Orchard Oriole *Ron Jensen*

Red-headed Woodpecker *Lawrence Baschak*

RED-HEADED WOODPECKER. On 5 July Bob Luterbach and Chris Adams observed a pair of Red-headed Woodpeckers at a nest in the Lumsden cemetery. The nest hole was in a dead cottonwood tree. On 12 July Lawrence Baschak and Stan Shadick photographed both adults as they brought food to the nest. This behaviour would indicate that there were young birds inside.

On 19 July at 0900 Bob Luterbach arrived at the cemetery to find Stuart Houston searching for the nest tree. The tree had been cut down, and three approximately 15-day-old young were found dead beside the stub. There was no sign of the adults.

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PRINCE ALBERT, SASKATCHEWAN, BIRDHOUSE TRAIL

KIM HRUSKA and KEVIN ASCHIM,
841 22nd St. East, Prince Albert,
Saskatchewan, S6V 1N9.

This is the third year in which the Prince Albert Birdhouse Trail has been in existence. The trail now consists of 115 houses, stretching south to Rosthern and north to Spruce Home and Meath Park.

As the figures indicate, we had an excellent occupancy rate in our houses but it was unfortunate that we were unable to attract any bluebirds as we did the previous year. We did have House Wrens and a chipmunk for the first time, however.

There were 10 incidences of another nest being started after the original nestlings left. These nests were probably built by different swallows. Many of the first nestlings left at least a week earlier than those of the past 2 years. This may account for the second nestings.

This nesting season we had little problem with sparrows occupying the bird houses. Sparrow nests were destroyed in three boxes which were later occupied by Tree Swallows. With the destruction of sparrow eggs and young, we hope this success will continue. The sparrows were responsible for the death of six adult swallows; however, four of these were in the same house.

TABLE 1: 1980 Prince Albert Bird House Trail Nestlings.

Species	*Live*	*Dead Young and Eggs*	*Houses Used*
Tree Swallow	547	99 (includes 7 adults)	105
House Wren	12	3	2
House Sparrow		32 (Destroyed)	4
Red Squirrel	4		1
Chipmunk (1 Adult)			1

Natality Rate of Tree Swallows (Including dead eggs.)	85.6%
Average Number of Live Young of Tree Swallows Per House	5.2

Our natality rate was not as high as it had been in the 2 previous years. A large number of infertile eggs was the major factor. Two houses had their roofs blown or knocked off during a very cool and wet week in late June which caused the deaths of all the nestlings within. One box was also ripped from its fence post and thrown in a river, drowning six fully developed young.

This is the second year in which we had four duck boxes along the North Saskatchewan River. With no success in the boxes placed low on the trees last year, we raised them to a height of 25-30 feet. These attracted three Common Goldeneye pairs which had 26 eggs with 23 hatching. We also had a pair of American Kestrels with five young, four of which survived to leave the nest.

If there are any people interested in setting up bird houses or participating in the Prince Albert Birdhouse Trail, they are welcome to contact either Kevin or me.

ANOTHER TAME RUFFED GROUSE

BRIAN L. BJARNASON, 13115 14 Ave., Surrey, B.C. V4A 1G6.

Until the arrival of the June issue of *Blue Jay* we felt that we were acquainted with the only Ruffed Grouse that was in need of psychiatric help. We have a cottage on Saturna Island, British Columbia, in the Strait of Georgia and experiences very similar to those of the Forsbergs.

It may have started the summer of 1975 when the two fellows who framed our cottage told us about a grouse who brought her brood down to the driveway on a number of occasions. They described her behavior as bringing them out on display. A couple of times they deliberately frightened her off as they were concerned about inadvertently hurting one of the chicks. Unfortunately, we did not make it over to the island during the short period of their performances.

Late the next spring I was at the cottage by myself for a few days making a start on the exterior siding. On the first day a male Ruffed Grouse appeared out of the bush and started following me around. By early afternoon he was getting in so close that once I almost stepped on him when I moved back suddenly. During the next couple of days he became a bit of a nuisance as I was swinging around cedar boards of up to 22 ft. in length and I was having to check both ends before moving each one. When standing still while measuring, marking and sawing he would come within a foot or so and would also be around the foot of the ladder whenever I went up. I worked for about 12 hours a day and he was present for most of the time — appearing out of the bush up the hill within minutes of my coming out in the morning. He would disappear for less than an hour a couple of times a day, presumably to feed, as we never fed him and he very seldom was seen to take the odd bit of vegetation around the cottage.

One day I went into the cottage and left the door open behind me. While in the kitchen getting a drink of water, I heard a scratching noise and looking around the corner saw him standing in the middle of the living room floor. As I was afraid of spooking him and winding up with a dead bird and a broken window, I went out the kitchen window. When he saw me later he immediately came out of the door and took up his usual position a couple of feet behind me.

For that summer and the next he would meet the car at the bottom of the hill and run behind it up the driveway to the cottage. With just my wife and I present he would get to within 2 or 3 feet of us, with more people around he would draw progressively further away. A few times he allowed me to lift him on my outstretched hand but was more relaxed when he walked up my arm to my shoulder, occasionally jumping up onto my head.

When arriving at the cottage very early the third spring he did not appear as we rolled down the hill. To this time we have not seen either him or any Ruffed Grouse in the area.

UNSEEMLY BEHAVIOR OF HOUSE SPARROW

FRANK BRAZIER, 2657 Cameron Street, Regina, Saskatchewan, S4T 2W5.

During the afternoon of 12 May 1980, I saw a very young House Sparrow sitting quietly on a tree limb close to the main trunk. Its bright yellow gape indicated that it had left the nest only recently. I was sitting no more than 10 feet from it at eye-level, and had a three-quarter profile view; its head was to my left. Its sex, of course, was unknown.

While I watched a male House Sparrow, in full breeding plumage, flew to the branch about a foot above the baby, paused for a few seconds, then dropped on to the back of the youngster and performed, briefly, what appeared to be an attempt at copulation. It then resumed its perch above the baby bird.

A few seconds later the mother sparrow arrived and fed her young one, then flew away. The male also departed.

At no time did any of the participants appear to be excited. The baby bird did not make any of the characteristic food-begging gestures which usually include wing-shivering. This latter act is imitated, by the female House Sparrow when she solicits the male's copulatory attentions. Neither did the baby utter the begging food calls which the female, at mating time, also imitates. If the baby had confused the male by giving the begging food calls or the wing-shivering display his reaction would have been understandable as the plumage difference between the young and the female is slight, and he was perched above and slightly behind the baby and perhaps could not see the yellow gape.

I could find nothing in Summers-Smith remotely approaching the male's inexplicable act.[1]

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[1] SUMMERS-SMITH, J. D. 1963. The House Sparrow, Collins, London.

1980 SASKATCHEWAN CHRISTMAS BIRD COUNT

From Saturday, 20 December 1980 to Monday, 4 January 1981, inclusive. Count area should be a circle, 24 km (15 miles) in diameter. This year, bird count forms will be sent to all compilers who submitted counts for Christmas 1979. Anyone else who wishes to send in a count, please write for a form to: Mrs. Mary I. Houston, 863 University Drive, Saskatoon, Sask. S7N 0J8.

Reports should be sent as soon as possible after the count (by January 15, 1981 at the latest) to the above address.

WHITETAILS AND THE 1979-80 WINTER IN SASKATCHEWAN

HUGH HUNT, Dept. of Tourism and Renewable Resources, 2602 8th Street East, Saskatoon, Saskatchewan, S7H 0V7, FREDERICK LEIGHTON and GARY WOBESER, Dept. of Veterinary Pathology, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0.

For the past several years, winter mortality of white-tailed deer in Saskatchewan has been monitored in a joint investigation by the Wildlife Research Division of the Department of Tourism and Renewable Resources and the Department of Veterinary Pathology of the Western College of Veterinary Medicine. White-tailed deer found dead by DTRR field staff during the winter were examined to measure their physical condition and to determine the factors causing and/or contributing to their death.

The study's findings in the most recent winter (1979-1980) are unique in several respects, presumably reflecting winter conditions in the province. Subjectively, the 1979-80 winter can be described as mild and relatively short throughout most of Saskatchewan. Snow pack in much of agricultural Saskatchewan was near or below the long-term average, daily temperatures were often higher than average, and winter ended earlier and more quickly than usual with a warm late March and an unusually warm April. For example, weather data collected by the Saskatchewan Research Council at Saskatoon indicate average or above average monthly mean temperatures for the Saskatoon area in November, December, February, and April along with a 13-day warm spell in January and a shorter one in late March. Lower-than-average mean wind speeds through the entire winter precluded acute wind chill values. Although Saskatoon received somewhat more snow than average, temperatures above freezing in each month helped to lessen the snow pack.

The mildness of the 1979-1980 winter was evident in the total of only 35 white-tailed deer submitted for necropsy compared to totals 3 to 5 times higher in the more severe 1973-1974, 1975-1976, and 1978-1979 winters. Most of the specimens (82.8%) had died as a result of collisions with automobiles (77.1%) or trains (5.7%) (Table 1); this type of mortality was 2 to 4 times more important than was the case in more severe winters. Predation accounted for two deaths, starvation for one, and the cause of death was unclear in three instances. In both cases of predation, domestic dogs were the predators and the deer were only maimed in the attacks. The deer were subsequently shot. During winters characterized by deeper snow than in 1978-1979, predator kills, principally by dogs, have accounted for up to a third of the specimens submitted. Starvation, of little consequence as a cause of mortality in the mild 1979-1980 winter, was more prevalent in the more severe winters, particularly 1973-1974.

Body condition estimates for each

TABLE 1: Cause of death of white-tailed deer specimens obtained during the 1979-80 winter.

Mortality Factor	*No. of Deer*	*% of Sample*
Automobile Collision	27	77.1
Train Collision	2	5.7
Predation	2	5.7
Starvation	1	2.9
Unknown	3	8.6
Total	35	100.0%

specimen, based on the amount of fat remaining in the carcass at the time of death, indicated the adult deer were in good body condition even late in the 1979-1980 winter and fawn deer had been able to maintain good body condition noticeably longer than in severe winters. The pregnancy rate of 60% (6 of 10) for fawn females was 2 to 3 times higher than has been recorded during severe winters.

Gross examination of rumen or stomach contents to describe winter diets revealed that woody browse was the principal food of almost 80% of the 1979-1980 deer. Cereal grains were the principal food of the remainder of the deer. Cereal grains and tame forages made up less of the diet of whitetails in the 1979-80 winter than in more severe winters, presumably because the mild weather conditions and shallow snow depths did not restrict the availability of natural foods. This suggests that white-tailed deer in the wild prefer natural foods over agricultural crops as their principal winter diet, given adequate supplies of each.

A complete assessment of the significance of the various causes of winter mortality of white-tailed deer was beyond the scope of our investigation. For example, deer dying from vehicle collisions were presumably over-represented in the sample because of the greater chance of discovery of these specimens in comparison to those animals dying from predation, starvation, or disease. However, factors such as the types of mortality occurring, body condition, pregnancy rates, and diets do provide some insight into the influence of each winter on the provincial deer herd. These indicators suggest the 1979-80 winter was a relatively easy winter for white-tailed deer in Saskatchewan.

White-tailed Deer *Wayne Lynch*

UNUSUAL WHITE-TAILED DEER BEHAVIOR

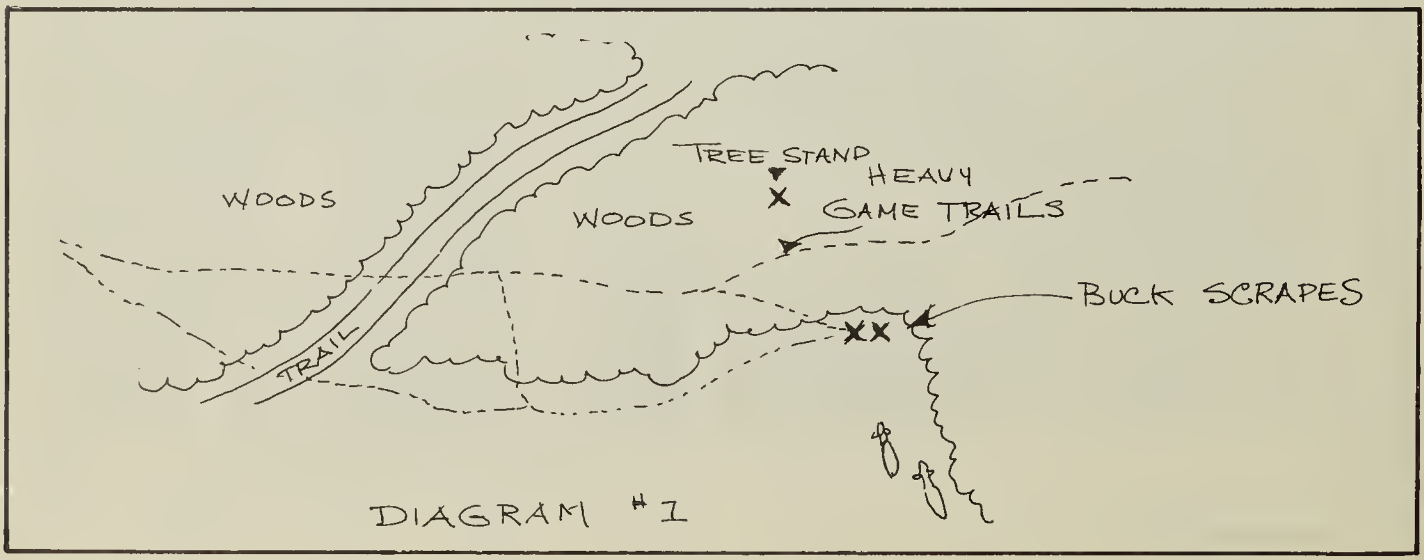
JAMES A. CARSON, 565 Linden Avenue, Winnipeg, Manitoba, R2K 0N9.

While bowhunting for deer in the Winnipeg vicinity on the evening of 10 November 1979, at approximately 1630, I made an unusual observation which I should like to record. What I saw was unusual in the sense that I've never seen it before during eight years hunting white-tailed deer in similar circumstances, nor have I ever read anything approaching it.

I had my tree stand set some 40 paces from two buck scrapes on the edge of a bluff or grove of trees. The habitat consisted of a mixture of oak, ash, elm and maple. Secondary growth was hazel and chokecherry. The area was fairly open. From 12 feet up in my stand I could see a fair distance in all directions. The ground had a light cover of snow which increased the capability of observing all nearby animal movements (Diagram no. 1).

Two white-tailed deer appeared. One was a doe, quite large, the other, which was smaller, appeared to be a yearling doe (spring 1979). When the two animals got within 50 yards or so, the smaller doe trotted over to one of the scrapes, meanwhile shaking its head from side to side. Upon reaching the scrape, she proceeded to jump up and down on it with all four feet lifting off the ground at the same time. Ears bent forward, legs very stiff, and tail straight in the air, she made a peculiar sight (Diagram no. 2).

She repeated this four times, then started biting at the branches above the scrape, virtually trying to break them off higher up, above what had been broken previously. Seconds later she kicked leaves and grass in a frenzy of activity. Scampering and playing like a dog, retreating from the scrape for several yards, then within the same moment running back to the scrape, neck stretched, nose down and smelling the bare ground. As she approached, she extended her front legs forward, hunching her back like a dog stretching, and shuffled backwards at a rapid pace. Doing this



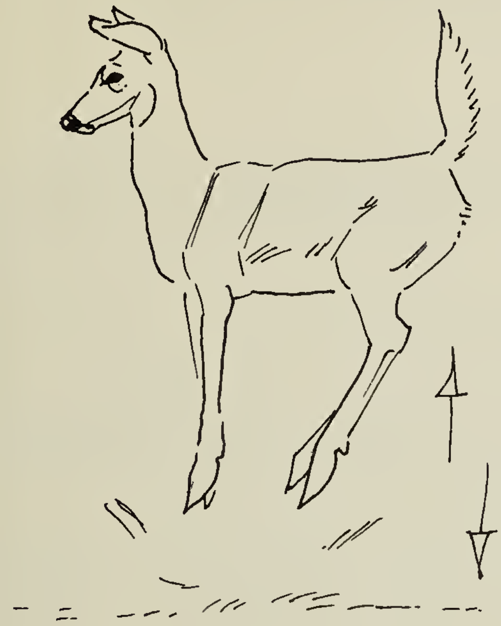


DIAGRAM #2

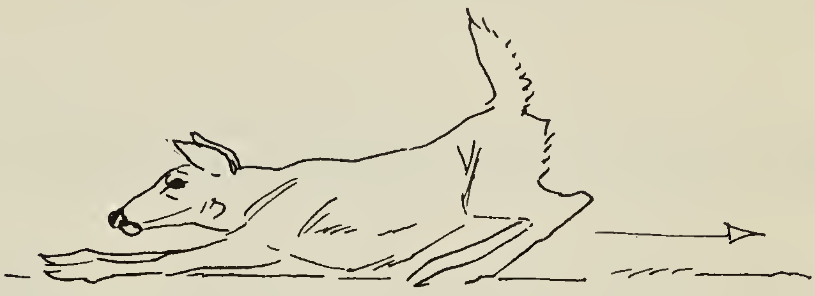


DIAGRAM #3

twice, she returned to the scrape to jump on it three more times with the stiff-legged posture. Then she walked away for several feet, urinating on the trail. She then ran down the trail in a terrific burst of speed, disappearing from sight (Diagram no. 3).

The larger doe approached the scrape at a walk and proceeded to bite the branches and paw the ground. She performed basically the same actions of those of the younger animal, but with more premeditated movements. At the end of the sequence she urinated in the middle of the scrape, turned, smelled the urine, and again with a sudden burst of energy followed the younger doe and disappeared.

1980 SASKATCHEWAN CHRISTMAS MAMMAL COUNT

Reports of mammals seen during the Christmas Bird Counts will be compiled again this year. When making your Christmas Bird Count, please note the number of each species of mammal seen, and the species of tracks that you can positively identify.

Send the list with your Bird Count by January 15, 1981, at the latest, to Mrs. Mary I. Houston, 863 University Drive, Saskatoon, Sask. S7N 0J8.

DISTRIBUTION OF THE YELLOW-BELLIED MARMOT IN ALBERTA

DAVID SCHOWALTER, Alberta Fish and Wildlife Division, O.S. Longman Laboratory, P.O. Box 8070, Stn. F, Edmonton, Alberta, T6H 4P2.

The yellow-bellied marmot (*Marmota flaviventris*) was first recorded in Alberta by Moore from north and east along the Milk River as far as Verdegris Coulee.[1] Soper indicated their occurrence along all of the Milk River and in the Waterton Region as well as an extralimital record at Lake Newell.[2] Johnston noted the species' occurrence along the St. Mary River to near Lethbridge and predicted its continued spread along the Oldman and South Saskatchewan Rivers.[3]

Phil Currie, of the Provincial Museum of Alberta, and myself encountered droppings and burrows characteristic of yellow-bellied marmots under a sandstone layer at the top of a river cutbank approximately 0.5 km east of the Hays Bridge on the Bow River (E½ 31-13-13 W4) on 9 June 1980. I returned to the location on 22 June and observed two yellow-bellied marmots through a spotting scope. This location is approximately 100 km from the nearest published record on the St. Mary River, however, only 36 km from the record at Lake Newell.

I have frequently encountered yellow-bellied marmots while collecting bats and skunks in southern Alberta in the past few years. Within the area of distribution known in 1970 the species is relatively common, occurring on most cutbanks along the rivers and along coulees draining into these.[3] They are particularly numerous where there are alfalfa planting and cause considerable damage to these. Away from banks they utilize rock piles and occasionally buildings. A solitary marmot lives under a building and adjacent haystack at NE 26-4-9-W4, and another nearby building also appears to be used by marmots. Al Norris of Warner, Alberta, also told me of a group of marmots living under an old house near his home.

Yellow-bellied marmots now occur also on the Oldman River; in a quick check on 27 June 1980 I found marmots near Kipp, in the city of Lethbridge, and near Diamond City. They appeared to be in small numbers at these locations compared to several locations on the Milk and St. Mary Rivers. The record at the Hays Bridge indicates that the species doubtlessly occurs further east along the Oldman River.

[1] MOORE, J. E. 1952. Notes on three additions to the rodent fauna of Alberta. Canadian Field-Naturalist 66:142-143.

[2] SOPER, J. D. 1964. The Mammals of Alberta. Hamly Press, Edmonton. 410 pp.

[3] JOHNSTON, A. 1970. Distribution of golden-mantled marmot in Alberta. Canadian Field-Naturalist 84:180-181.

SOCIETY NEWS

SASKATCHEWAN NATURAL HISTORY SOCIETY AWARDS 1980

CONSERVATION AWARD

Two Conservation Awards were presented at the SNHS Annual Meeting in Saskatoon on 18 October. One was made to FENTON R. VANCE to recognize his interest in native prairie plants and his efforts to ensure the protection of Saskatchewan's floral emblem.

Fenton Vance has photographed many of Saskatchewan's wildflowers, and he and his late wife presented their show of flower slides to many audiences. His photographs were also used in *Wildflowers Across the Prairies*, co-authored with J. R. Jowsey and J. S. McLean and published in 1977. From 1972, when he retired from Saskatchewan Government Telephones, Mr. Vance devoted his efforts to a campaign to have the Saskatchewan Floral Act amended to designate the emblem as the "Western Red Lily" and to ensure its protection. In 1974, he presented a brief to the Government of Saskatchewan and had 6,000 cards of the Western Red Lily printed with information about it and a plea for its protection. He has worked unceasingly to stimulate public interest in the floral emblem and to persuade the Government of the need for further legislation.

A conservation Award was also presented to ROSE McLAUGHLIN of Indian Head in recognition of a lifetime devoted to promoting an understanding and appreciation of nature. Most recently, she has initiated a Celebrate Saskatchewan project in the Saskatchewan Natural History Society to give publicity to the Western Red Lily. A poster with a photo by Fenton Vance is being distributed, along with information about the floral emblem, in the schools.

Rose McLaughlin grew up on a farm at Francis, appreciating all the natural wonders around her. She vividly remembers walks with her mother looking for wildflowers on the prairie. Later, she was introduced to the *Blue Jay* by another naturalist-writer, Mrs. Marion Nixon.

In making the award to Rose McLaughlin, the Society President Lorne Scott paid a personal tribute to her influence with young people. He said: "When I started my eighth grade at a remote one-room country school near Indian Head, Mrs. McLaughlin was my teacher. The subject I remembered most that year was Science. For the first time we had field trips during class time. When March arrived a "Signs of Spring" chart was kept with everyone participating in recording the arrival of birds and other signs of spring. Each year since, I have maintained my own "Signs of Spring" chart. By the end of the school year I, along with the other older boys, had pretty well hung up my gopher traps, slingshots and rabbit snares. Mrs. McLaughlin continues to educate young and old alike through her writings and teachings. Her enthusiasm and keen interest in nature has enriched many of our lives."

CLIFF SHAW AWARD

The Cliff Shaw Memorial Award is presented annually to recognize the type of achievement that would have appealed to this second editor of the Blue Jay (1946-48) and second president of the Saskatchewan Natural History Society (1950-51) — an outstanding contribution to the *Blue Jay.* Cliff Shaw, an all-round naturalist and a professional newspaperman whose articles were unusually factual and well written was a beloved member of our society in its early formative years.

This year the award was made to HAMILTON MACK LAING now of Comox, British Columbia, for his "Early Manitoba Bird Notes" in the June 1980 issue of the *Blue Jay* — an engaging series of early reminiscences about Laing's early experiences with birds in Manitoba. These "notes" now have a special value, since the recollections of Mr. Laing (who is now 97 years of age) date back so many years and give us a picture of the birdlife of a period with which we are rapidly losing contact.

Canada Goose *Fred W. Lahrman*

SASKATCHEWAN NATURAL HISTORY SOCIETY

Financial Statement — Year Ending September 30, 1980

INCOME

Memberships (including sales of Blue Jay)		14891.94	
Memberships (extra re: supporting and sustaining)		1640.00	16531.94
Spec. Pub. No. 1 Guide to Sask. Mammals	64.80		
Spec. Pub. No. 2 Birds of Sask. River	Out of print		
Spec. Pub. No. 3 Birds of Regina	Out of print		
Spec. Pub. No. 4 Blue Jay Index (1942-60)	28.80		
Spec. Pub. No. 5 Birds of Lake Athabasca	38.26		
Spec. Pub. No. 6 Birds of N.E. Sask.	59.21		
Spec. Pub. No. 7 Birds of Moose Mountain	67.01		
Spec. Pub. No. 8 Blue Jay Index (1961-69)	27.00		
Spec. Pub. No. 9 Birds of Rosetown-Biggar	7.40		
Spec. Pub. No. 10 Birds of Gainsborough-Lyleton	259.08		
Spec. Pub. No. 11 Blue Jay Index (1970-78)	270.61		
Spec. Pub. No. 12 Birds of Regina (1980 revision)	1216.79		
Spec. Pub. No. 13 Birds of the Qu'Appelle (1857-1979)	1967.85		
Publication Hours and the Birds	Out of print		
Publication Birds of the Elbow	6.87	4077.68	
Donations — General		313.50	
Interest (Savings account and bonds)		1343.89	
Miscellaneous (Premium re: U.S. funds)		125.96	
Sales from Blue Jay Bookshop	12402.89		
Less: Cost of sales	9219.12		
Gross profit (25.7% of sales)	3183.77		
Less: Postage, supplies, etc.	543.80		
Honoraria	1056.00		
Net profit (12.8% of sales)		1583.97	7445.00
			23976.94

EXPENSE

Printing of Blue Jay (4 issues)		12936.76	
Printing of Newsletter (2 issues)		1123.42	
Honoraria (650, 250, 500, 20)		1420.00	
Postage		893.65	
Office supplies and stationery		188.85	
Office equipment (address plates)		65.15	
Misc. office and admin. expense		599.21	
Annual meeting 1979 (Regina)		31.88	
Printing cost of Blue Jay Index (1970-78)		1257.05	
Printing cost of Birds of Regina (1980 revision)	5809.50		
Less: Donations and province of Sask. and C.N.F. grants	4499.28	1310.22	
Printing cost of Birds of the Qu'Appelle (1857-1979)	7295.55		
Less: Donations and province of Sask. and C.N.F. grants	5989.78	1305.77	
In memoriam re: Larry Morgotch & Ralph Stueck (S.N.H.S. contrib. to spec. pub.)		50.00	21181.96
EXCESS OF INCOME OVER EXPENDITURE			2794.98

Statement of Assets and Liabilities at September 30, 1980

ASSETS

Cash on hand (Bookshop)			40.00
Cash in bank (chequing) — SNHS		5638.72	
— Bookshop		2350.63	
Cash in bank (savings) — SNHS		12201.41	20190.76
Canada Savings bonds			5000.00
Stock on hand (Bookshop)			4025.80
Accounts receivable (521.14 less prepaid orders 154.58)			366.56
Deposits with Postal Dept.			272.59
			29895.71

LIABILITIES

Trust fund re: Sanctuaries and Conservation areas			
Balance at September 30, 1979		3840.97	
Costs of Prairie Lily education campaign	1026.22		
Less: Donations	550.00	476.22	
		3364.75	
Big Gully Sanctuary: 1980 donations		462.00	3826.75
Donations in support of special publications			2000.00
Loan for special publications (interest-free)			2000.00
Accounts payable: estimate for September Blue Jay			3300.00
Owing re: Honoraria (Bookshop)			1031.31
Owing re: Education Tax			8.58

NET WORTH

Balance at September 30, 1979		14935.09	
Plus surplus for year ending September 30, 1980		2794.98	17730.07
			29895.71

NATURE LIBRARY

BIRDS OF THE QU'APPELLE, 1857-1979

E. MANLEY CALLIN. 1980. Special Publication No. 13, Saskatchewan Natural History Society, Box 1121, Regina, Saskatchewan, S4P 3B4. 168 pp. $7.00.

The Qu'Appelle Valley of southeastern Saskatchewan is a beautiful place. The meandering Qu'Appelle River makes its way eastward to eventually enter the Assiniboine River in Manitoba, coursing through a wide valley cut and shaped in the distant past by glacial meltwaters. For the prairie traveller this broad valley with its wide river and series of inter-connecting lakes presents a magnificent view in all seasons. The grassy south-facing slopes and wooded north-facing slopes present a striking contrast and show the effects of sunlight, wind, and climate. The Qu'Appelle Valley is like an upside-down mountain and offers equally exciting vistas for the enlightened viewer. It is a pleasant place to go birding and now there is a handsome book to serve as a guide.

Possibly the best regional report in North America, it is difficult to make comparisons with Manley Callin's epic study of the birds of the Qu'Appelle Valley from near Regina east to the Manitoba border. What makes this study so useful is the thorough historical review of records by early travellers and settlers in the region, many of whom were astute birders, plus the lengthy, almost daily records kept by Callin, his twin brother Elmer, and John Nelson from 1926 to 1951-52. Manley Callin's notes, again made almost daily in written form, run from 1926 to 1979.

The territory covered by this study is a strip 170 km long, 55 km wide at the west end and 40 km wide at the east end, which includes considerable upland habitat outside of the valley proper. It is a study area that has lakes and river, marshes, sloughs and ponds. Fairly heavy forest cover is found in the numerous coulees, on southern slopes of the valley, and occasionally along the river or streams that feed into it. Otherwise, much of the valley bottom is a large meadow. The vegetation of the area is discussed in considerable detail.

Although basically an annotated list of birds, the introductory material (40 pages) covers a wide range of information. The author provides an excellent description of the area, including general vegetation, topography and geology. The emphasis is on features primarily affecting bird distribution. It is interesting to note that the habitat ranges from upland mixed-grass prairie, through aspen parkland, wooded ravines, lakes, rivers and streams, sloughs and marshes, to bur oak forest on the eastern extremity of the valley. Ten fine black and white photographs by Robert R. Taylor illustrate the variety of landscape in the study area. A striking sketch by Fred W. Lahrman of the Rose-breasted Grosbeak — a typical breeding bird of the valley — provides a suitable illustration for the cover of the book. What an attractive place the Qu'Appelle Valley is, and how fortunate Manley Callin has been to have spent all his life in or near the area.

And how fortunate for ornithology that Manley and his brother Elmer got off to an early start in bird study, making their first written record of the birds of the year at the early age of 14.

The wide variety of habitats in the area, as well as the extensive coverage of the birds, have yielded a long list of species. In all, 296 species of birds are discussed in detail (and one more, no. 297, appears as an addendum with a "STOP THE PRESSES!" note at the end of the species account. This is for an Iceland Gull found on April 24, 1980, long after the manuscript was at the printer). This is a large number of species and, as the author points out, many of them are rare or uncommon birds. Annual totals in most of the last 20 years have ranged from 170 to 200.

There is a careful analysis of seasonal occurrence and a list of breeding birds for the area. The list is broken down into "breeding proved", "suspected breeding", "permanent resident", "usually only a transient", and "mid-winter" occurrence. This is a helpful treatment of the total list. There are 133 proven breeding species and 21 suspected of breeding, a total of 154, a high number indeed for this study area. Another table lists 39 species as extirpated (1), transient (14), vagrant (4), and winter visitant (2). An additional 30 breeding birds were recorded present in winter, plus 15 permanent residents, yielding a total of 84 species recorded in winter. This informative table is followed by a discussion of the reasons for the high number of birds recorded in winter (including 13 species of ducks and geese).

This interesting account is followed by a review of the "characteristic birds of the valley itself." Here we are shown species or groups "that set the valley apart from the adjacent parklands." This is one of the most interesting sections of the introduction and clearly indicates the influence of the valley on the birdlife of the area.

Manley has gone to considerable length to ensure that his descriptive terms of status can be compared to other areas, borrowing from the standards established by the Federation of New York State Bird Clubs in 1954. There follows a detailed and cautious review of the significance of the data, a most useful treatment and a handy guide.

The author found a "wealth of information" available from other observers and he gives a precise account of the years and areas in which these people studied. This is followed by significant biographical information on "pioneer residents who kept records" (4), "pioneer non-residents who kept records" (7), "observers still resident who kept records" (6), "observers previously resident who kept records" (7), and "later non-residents who kept records" (4). This section, which covers 11 pages of the introduction, pays appropriate homage to major contributors to this book. The early historical information made available through careful exploration of published and unpublished material gives a unique value to the bird accounts. As expected, considerable assistance was received from Stuart and Mary Houston in bringing this data together.

Two pages of acknowledgments give generous credit to a large number of persons for assistance in various ways, not the least of which is directed to Stuart and Mary Houston.

There are six pages of "Literature Cited", a further indication of the extent to which past and pertinent records have been brought together to provide a firm foundation for this authoritative account of the "Birds of the Qu'Appelle Valley; 1857-1979." An additional benefit to the reader is the provision of an index to bird species.

The species accounts are, as might be expected, readable, interesting and done with a pleasant flair. It is a pleasure to see so much information on so many species recorded in this fashion for this portion of central Canada. This report is more than another chapter in the eventual "Birds of Saskatchewan" that I expect is likely to appear in the not too distant future. Carefully researched studies such as Manley Callin's, together with an abundance and careful assessment of records by the author, make this an account of unusual ornithological value. To birders in this region it is a delightful and particularly accurate portrayal of what can be expected. The author and all those who assisted him deserve full marks for ample homework. The Saskatchewan Natural History Society should be proud of this latest book in their series of special publications. I think Manley Callin's book deserves an award. — Reviewed by *Robert W. Nero*, Box 14, 1495 St. James Street, Winnipeg, Manitoba, R3H 0W9.

ERNEST THOMPSON SETON IN MANITOBA, 1882-1892.

Introduction by C. Stuart Houston. 1980. Premium Ventures Ltd. in cooperation with the Manitoba Naturalists Society, 214 - 190 Rupert Avenue, Winnipeg, Manitoba, R3B 0N2. $11.95, plus $1.00 for postage and handling.

All fans of Ernest Thompson Seton will want a copy of this new book which is a compilation of six semi-technical reports on Manitoba wildlife, all long out of print. Included are annotated lists of the mammals (1887), birds (1980-91), additional bird records (1908), "recent" bird records (1908), fishes (1898), and reptiles and amphibians (1918).

For the naturalist and scientist, there is simply nowhere else to turn for accounts of the vertebrate fauna of Manitoba in the early historic period. Through correspondence and acquaintance with other naturalists in the region, Seton assembled a surprising amount of information. The mammals and fish lists have been replaced by recent publications, but there is as yet no other provincial bird book, hence ornithologists still find Seton's works useful, indeed, essential. To have not only his primary work on Manitoba birds, but his up-dated records as well, under one cover gives this new Seton publication special value.

This work was published by the Manitoba Naturalists Society to commemorate the annual meeting of the Canadian Nature Federation in Winnipeg in August 1980. Registrants at that memorable meeting were properly surprised to receive the book as a free gift from the sponsoring organization, the Manitoba Naturalists Society.

Each section has a foreword by four separate authorities (birds — C. S. Houston; mammals — R. W. Nero; fishes — K. H. Doan; reptiles and amphibians — W. B. Preston). The brief reviews provide a welcome perspective to Seton's several works.

Dr. C. Stuart Houston, whose competent and thorough analysis covers all three bird reports, also wrote the overall introduction to the combined works. In it, he adds the final brush strokes to a clear picture of the activities of Seton in this region, including his homesteading efforts in Saskatchewan. Seton's relatives and acquaintances are also dealt with in

Houston's historical analysis and report that provides the last word on Seton's travels in this region. It is a masterful touch that makes this volume of special value. Two detailed maps, incidentally, make it emphatically clear where Seton travelled and studied.

For many readers, this work will offer fresh insight into Seton as a field worker and writer, and it firmly establishes the extent to which Manitoba (and a little of Saskatchewan) provided Seton with an opportunity to develop his remarkable talents as an observer, writer, and artist.

The volume includes two signed photographs of Seton — a fine portrait, and a revealing shot of the artist-naturalist, fully clothed and sitting cross-legged in a small tent, writing in a notebook, wearing what an Englishman should — a hat, vest, and bowtie! The latter photograph was taken at Shoal Lake (near the Saskatchewan border) in 1901. It is used on the outside back cover.

The main portion of this volume, "The Birds of Manitoba", was published by the Smithsonian Institution as Proceedings of the US National Museum. The two successive lists were published in *The Auk*, journal of the American Ornithologists' Union. Seton, as pointed out by Dr. Houston, was "included among the first 87 associates at the founding meeting of the American Ornithologists' Union in New York City on 26 September 1883 . . .".

Seton's "A List of the Mammals of Manitoba" was published in the "Transactions of the Manitoba Scientific and Historical Society, No. 23, May, 1886." His list of fishes was published in *Forest and Stream*, a weekly journal of the "Rod and Gun", New York City. "A List of the Turtles, Snakes and Batrachians of Manitoba" was published in *The Ottawa Naturalist*. It should be noted that all these works were photocopied from the original publications for inclusion in this useful book. The story of the many search efforts and headaches involved in locating this material and seeking permission to reprint it can best be told by Dr. Houston and Ardythe McMaster, both of whom worked so long and diligently, and in haste, in order to get it done in time for the CNF meeting! There is even included, for the first time in print, a copy of the original order-in-council appointing Ernest E. Thompson (one of several of Seton's names) as the first naturalist for the province of Manitoba. Let there be no doubt, this is the definitive volume on Seton in Manitoba and Saskatchewan.

The cover of the book is appropriately decorated with a photograph by Joyce Holmes of a man silhouetted against a prairie landscape. It could be Seton himself.

Now, every interested person can obtain this "collection of Seton's important scientific contributions to the early knowledge of natural history in Manitoba." Fortunately, Seton was an excellent writer, as well as a naturalist, and his accounts are highly readable. Take, for example this sample chosen at random from Seton's report on the still poorly known Swamp Sparrow: "To the Swamp Sparrows we are indebted no little for the merry twittering and the bustling signs of life about the brushy sloughs and reedy swamps of our country.

"They delight in these damp thickets and may be seen continually scrambling around in the sedge and wet tangle or running on the floating reeds, holding 'their skirts' very high, standing very high on their legs, with tails much raised, and otherwise showing great fear of getting wet. When they take wing, they flit over the water with rustling flight and tail rapidly pumping up and down; they usually make for the nearest bush or tussock, and then appear to tumble into it with nervous haste." — Reviewed by *Robert W. Nero*, Box 14, 1495 St. James Street, Winnipeg, Manitoba, R3H 0W9.

RESEARCH IS A PASSION WITH ME

MARGARET MORSE NICE. 1979. Consolidated Amethyst Communications, 12 Crescent Town Road, Unit 310, Toronto, Ontario, M4C 5L3.

Born in Amherst, Massachusetts in December 1883, the daughter of a history professor, Margaret Morse Nice probably contributed more to scientific ornithology than any other amateur in this century. Indeed, by pioneering and revolutionizing the study of bird behaviour, she led the professionals. Although she died in June 1974 at the age of 90 years, her autobiography was not published until late in 1979.

The Foreword is by the Nobel prize winner, Konrad Lorenz, with whom she worked in Austria in 1938. Lorenz says: "Margaret Morse Nice was a naturalist in the truest sense of the word. . . . Her attitude towards nature was retained — up to her high old age — that of a child's wide-eyed wonder, combined with a childlike curiosity which is exactly what a scientist's attitude ought to be, but so very seldom is."

The autobiography tells of her childhood, her University studies, and her marriage in 1909 to a fellow graduate student, Blaine Nice, thus forever stopping her studies towards a Ph.D. degree. However, Blaine, "a most understanding and sympathetic husband," made possible her travels and studies, which "involved much more outlay of money than income derived from it."

Her first ornithology paper in 1910 told of the food of the Bobwhite. After they moved to Oklahoma in 1913, her second paper in 1921 was a study of Mourning Dove nesting on the University of Oklahoma campus at Norman. Much of her time was devoted to collecting and publishing details of the daily development of vocabulary by her four children, summarized in seven major papers in psychology journals. She and Blaine also found time to collect material for *The Birds of Oklahoma* in 1924, which she augmented and revised in 1931.

The work which was to make her famous began after they moved to Columbus, Ohio, in the fall of 1937. In the next ten years, before they moved to Chicago, they lived adjacent to 60 acres of wild, neglected land between two bridges at the edge of Columbus. Here Margaret Nice made her detailed studies of the Song Sparrow, which resulted in a two-part, 56-page paper in German in the *Journal fur Ornithologie*, and then in a two-volume monograph in 1937 and 1943. She collected so much data from her observations and banding that it took an entire year to write the first volume. One year she had 69 male Song Sparrows on her 40-acre study area. Her oldest bird, "4M", eight years old, began singing on 11 May 1934 at 0442; he sang up to 278 times an hour, for a total of 2,305 songs for the day.

Her diary allows presentation of unusual detail on many topics. There are interesting sidelights concerning almost all of the "big names" of ornithology at the time, and of the major meetings of these people. There are many trivia, some of which are fascinating. Imagine paying only eight dollars for 300 reprints of a 19-page paper (in 1908)!

In later years, as her field work diminished, she became noted for her prolific reviews in *Bird Banding* — 719 in four years through April 1940, for example. She also traced back to Aristotle the source of 20 centuries of uncritical quotation of erroneous figures for the length of incubation of many bird species.

Margaret Nice received many honours. She was the fifth woman elected to what is now Elective Membership in the American Ornithologists' Union (AOU), and the second woman to become a Fellow of the AOU. She was elected President of the Wilson Ornithological Club in 1937. She received richly deserved honorary degrees of Doctor of Science from her alma mater, Mount Holyoke College, in 1955, and from Elmira College in 1962. On the latter occasion, the dean said of her: "She used the outdoors near her home as her laboratory and common species of birds as her subject. In so doing . . . (she) saw so much in what appeared common to so many."

We are indebted to Canadian ornithologist, Doris Huestis Spiers, for editing this book. Canadians can be proud indeed that a small group of women naturalists in the Toronto area, known as the Margaret Morse Nice Ornithological Club, have made possible this autobiography of this important and fascinating woman. — Reviewed by *C. Stuart Houston*, 863 University Drive, Saskatoon, Saskatchewan, S7N 0J8.

Stemless Lady's Slipper *Ron Jensen*

LETTERS

PARISITIZING BY BREWER'S BLACKBIRD?

Of the four Warbling Vireo nests I discovered at Turtle Lake this summer, only one was successful. All four nests were in birches, less than 200 ft. apart. The most interesting nest was located on a steep slope in front of my cabin where I was able to observe the birds daily from my balcony with binoculars. We had photographed the bird on the nest on 3 July, so when we returned 10 July we expected to see babies. On 9 July, a horde of blackbirds had descended on the "point" (our peninsula) and harassed and tormented our wee birds. On 11 July we noted no activity around the nest so I investigated. Instead of vireos we found a single brown blotched egg (chipped). I removed it and returned to Saskatoon to consult with Bernie Gollop who suggested it might be a Brewer's Blackbird egg. This was later confirmed by Jim Slimmon.

Of note: The flock of blackbirds consisted of immature and females of Brewer's, Yellow-headed and Red-winged Blackbirds. I had not examined the contents of the Vireo nest earlier because we had already had two nests vandalized (possibly by red squirrels) and hoped to prevent a recurrence. Warbling Vireos nest regularly on Indian Point, but they were in greater numbers this year, possibly because forest tent caterpillars, while denuding most deciduous trees for 20 miles around in June, had not touched our point. — *Muriel Carlson*, 406 Spruce Drive, Saskatoon, Saskatchewan, S7N 2N4.

PROTECTING WHOOPING CRANES

In October 1979, a pair of Whooping Cranes with one chick stopped at a shallow lake north of Unity, Saskatchewan. The juvenile was banded (red left leg, blue-white-blue right leg). The goose hunting season was on and there was a big flock of white geese on the same lake. When they were disturbed by hunters, the white cranes flew up too.

The reason that I write this letter is to thank the land owner who was really interested and helpful. . . . He posted all his land with signs. The result was that both adults and juveniles arrived safely in Aransas on 5 October 1979. Many thanks to Mr. and Mrs. Slater of Unity (N½1-41-23 W3), Ken Smith, conservation officer of North Battleford, and Ernie Kuyt, CWS, Edmonton. — *Hans de Vogel*, Neilburg, Saskatchewan, S0M 2C0.

OWL BANDING IN SASKATCHEWAN

If you've ever gone owl-banding, you'll think it is a very remarkable, even risky, thing to do. And that is exactly what it is. To go out and see an owl get banded is fun. When I went owl banding with Dr. Houston, we only found one little owl. We helped band it, though. The band has to be fairly large in order to get it around the owl's foot. The owl we banded had recently fallen out of its nest. Once it was banded properly, the owl was brought back up to the nest on a rope with a stick on it so that the owl was not injured in any way. Owl banding in Saskatchewan should increase so that people know what to do when they come across a dead owl, or a little owl which has fallen out of its nest. — *Tony Hrynewich*, Grade 5, Dixon Lake School, Crystal Springs, Saskatchewan, S0K 1A0.

Great Horned Owl *Lorne Scott*

MORE JACK RABBITS

I was pleased to see two articles in the June 1980 issue of the *Blue Jay* on the concentration of white-tailed jack rabbits by Fred W. Lahrman and Robert Kreba. I have seen large concentrations of these rabbits during the winters of 1978-79 and 1979-80.

It has been my duty, painful at times, to have to exercise two dogs, one a German Short-haired Pointer and the other a Miniature Poodle. They are known as "The Odd Couple". I exercise them by taking them out in the country and walking with them on some untravelled road. In the winter, when the snow is deep enough, I put on a pair of snowshoes and we leave the road.

One of the favourite places is on land belonging to the Experimental Farm, but to the south and west of the Saskatchewan Power Corporation Transformers, south-east of Regina. On this land there are two long hedges, which have been planted. These hedges seem to provide the jack rabbits with shelter.

The dogs have a good time attempting to chase the jack rabbits. The rabbits do not seem to mind as the chances of one of them being caught are minimal.

The largest number I have seen, at one time, was 22 and 40 in one afternoon, but you can be sure of seeing a good many on any afternoon. Although there is a concentration of rabbits, I have not seen a concentration of predators. The pointer, however, frequently finds portions of jack rabbits which have fallen prey to some bird or animal. These she carefully buries in the snow, to be exhumed the next time we cover the territory and re-buried in a different spot.

I would like to know if anyone has an explanation for this concentration. The hedges do provide shelter and this is increased by the drifts of snow, which pile up against the hedges. There would appear to be ample food in the stubble fields surrounding the hedges and as far as I can see the bark on the shrubs has not been eaten. They may not like this particular type of bark. There is no aspen in the area.

As if to contradict the shelter idea, I am told that there are many jack rabbits just east of the elevators at Rowatt, in open country. — *J. W. Jackson*, 233 Frontenac Drive, Regina, Saskatchewan, S4S 4L2.

LOOKING BACK

As we end our thirty-eighth year of publication, and my term as editor of the *Blue Jay*, I would like to pay tribute to those individuals who have helped to make the *Blue Jay* the respected journal that it is.

Associate editors Margaret Belcher, J. Bernard Gollop and George Ledingham spent many hours editing and revising the material that came in for each issue. Proofreaders Georgina Jackson, Shirley Jowsey, Barbara Shourounis and JoAnn Skenderovich meticulously checked the galleys against the text as sent to the printers. Centax of Canada, and Midwest Litho Limited have given us excellent printing.

Many others besides those mentioned on the inside front cover of each issue contribute to our success. As long as I have been editor, Ron Hooper of the Museum of Natural History has checked the insect articles, and F. M. Atton of the Fisheries Research Laboratory has checked the fisheries articles. George Mitchell of the University of Regina has read much of the mammal material, and Diane Secoy of the same university has read the reptile material. Robert W. Nero checked the material from Manitoba.

Fred W. Lahrman, Lorne Scott and Wayne Lynch have been generous in supplying many of the photographs that illustrated articles in the *Blue Jay*. C. Stuart Houston has supplied a great many articles, and has persuaded many other naturalists to become contributors to our magazine.

We depend on the contributions of a great many readers — both dedicated amateurs and professionals. The wide range of material that arrives in the mail for each issue continues to amaze me. Most of our articles are unsolicited, yet we never have a lack of material. The *Blue Jay* claims to be a journal of natural history and conservation for Saskatchewan and adjacent regions, and it is gratifying to see the amount of material submitted from Alberta and Manitoba.

I trust that my successors as editor, Wayne Harris and Sheila Lamont will receive the same co-operation and understanding as I have from the members and Board of Directors of our Society. It has been a pleasure and a privilege to follow in the illustrious footsteps of Isabel Priestly, Cliff Shaw, Lloyd Carmichael, George Ledingham and Bernie Gollop.

Gary W Seale

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